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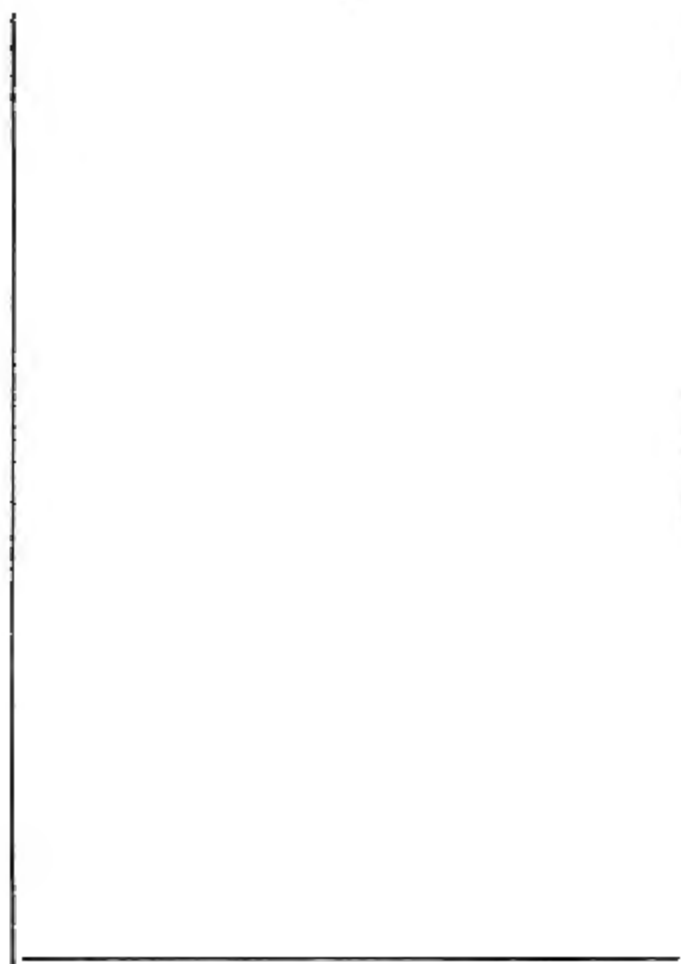
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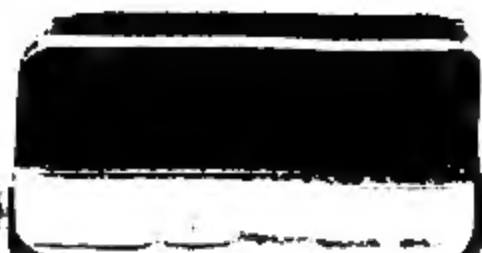
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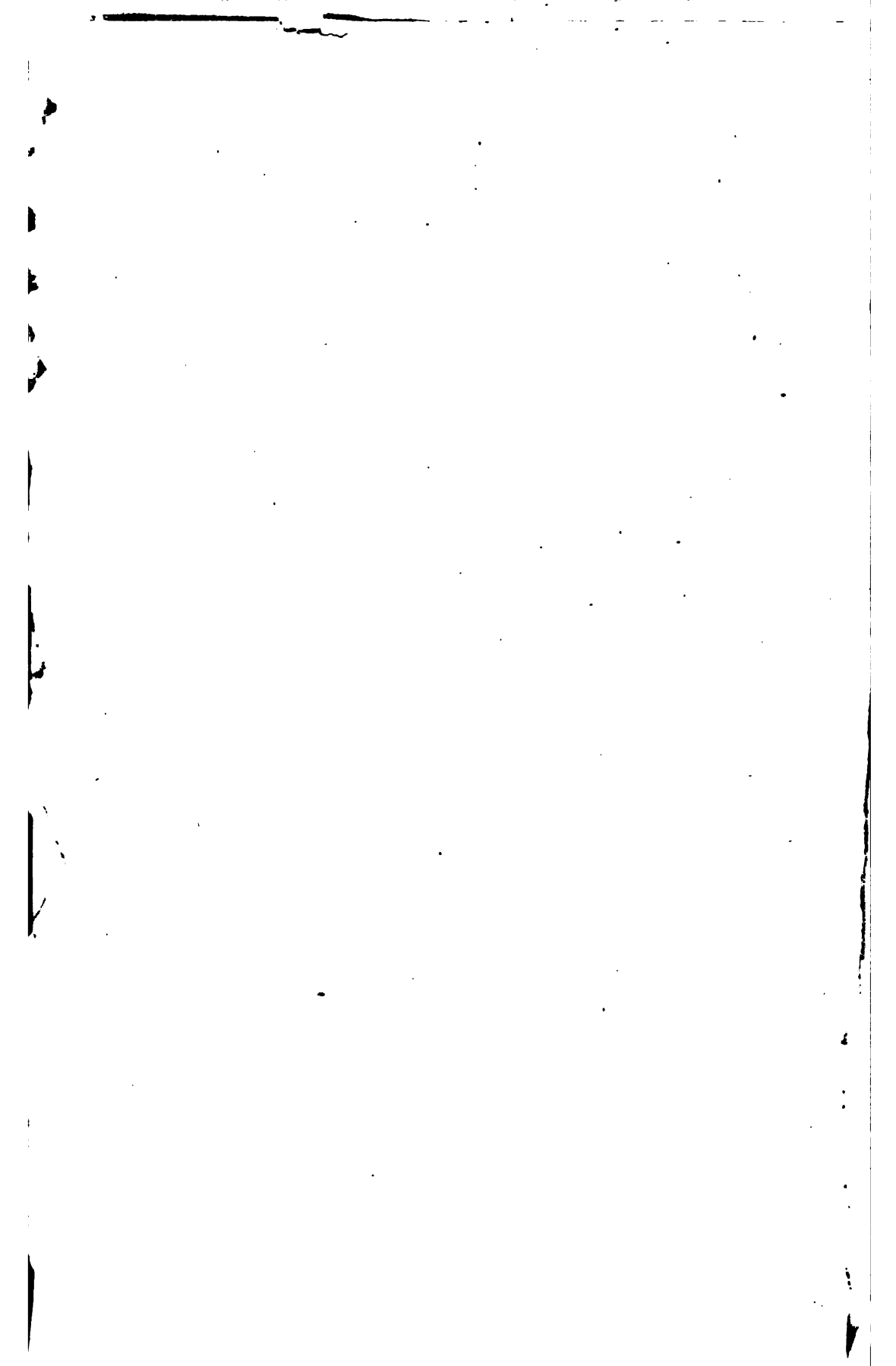
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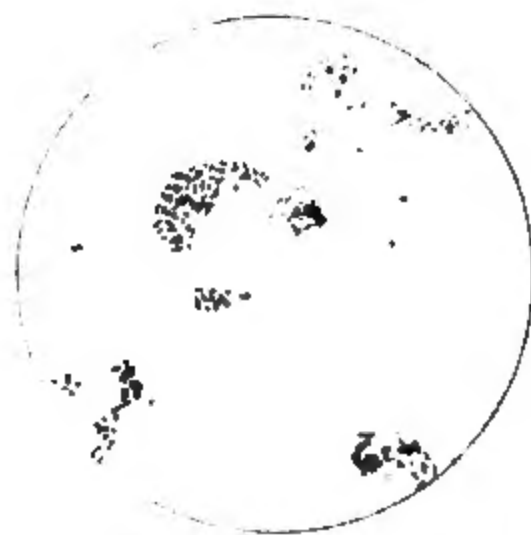




TUBERCLE BACILLI IN SPUTUM



DIPHTHERIA PURE CULTURE



TYPHOID PURE CULTURE

THE ECLECTIC PRACTICE OF MEDICINE

BY

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ILLUSTRATED



CINCINNATI, OHIO
THE SCUDDER BROTHERS COMPANY
1906

To
THE MEMORY OF MY FATHER AND PRECEPTOR,
Milton L. Thomas, M. D.,

A PIONEER OF ECLECTICISM, AND ONE OF THE
MOST SUCCESSFUL PRACTITIONERS IT HAS BEEN
MY FORTUNE TO MEET, AND WHO FIRST GUIDED
MY STEPS IN THE WAY OF SPECIFIC MEDICATION,

This Work is Dedicated

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PREFACE.

I offer neither apology nor excuse for placing before the profession another Practice of Medicine. Eclecticism has won its way into the homes of many thousands, since Wooster Beach and the "Fathers" taught a more successful way of treating the sick. The methods of the "New School" are being examined and tested as never before, and men from all schools are recognizing the efficiency of our splendid *materia medica*.

In writing a New Practice, I do not desire it to be understood that most of the material used is new, for it is one of the fundamental principles of Specific Medication (Modern Eclecticism), that when once the relation of drug action to diseased conditions is found, it is found for all time; that an agent that will correct a *specific* condition to-day, will correct the *same condition* to-morrow, next year, or a hundred years hence, therefore many of the remedies used twenty-five, thirty, or fifty years ago, are used to-day.

We have faith in the Eclectic Practice, and the desire on the part of the students of our colleges to use a Practice, more modern than the older Eclectic works on Medicine, one that is up-to-date in etiology, pathology, description, diagnosis, and treatment, is responsible for the publication of this work.

The etiology and pathology must necessarily be the same in all works on Practice and this will only materially differ from other works of like character in presenting a treatment that is proving successful in the hands of more than ten thousand practitioners. I am indebted to a host of able workers, who have, at the bedside, tested and proven many of the agents used.

To W. B. Saunders & Co., Lea Bros. & Co., The Hahne-
mann Press, P. Blakiston's Son & Co., D. Appleton & Co., and
F. A. Davis Co., I am particularly indebted for courtesies
shown in the use of illustrations. I have endeavored to give
explicit credit to each author where references are cited, and
my thanks are due them for favors extended.

I trust that the reader will find the twenty-five years' experi-
ence of the writer, as well as those of his many brother prac-
titioners, a help in successfully relieving the sick.

ROLLA L. THOMAS, M. D.

CINCINNATI, O.

February 10, 1906.

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INTRODUCTION.

It may be well to state our position in the medical world, for there seems to be a great deal of confusion or ignorance as to what Eclectics teach and practice, the idea prevailing among a large class, that Eclecticism consists in choosing the best remedies from all the other schools, and while this is true to some extent, it applies equally to all schools, for every conscientious physician has and does exercise the same prerogative, choosing, what he thinks is the best remedy.

Choosing the best therefore is not characteristic of Eclectics; neither is the use of vegetable remedies the distinguishing difference, though we have been developing a *materia medica* for the last seventy-five years, till to-day it stands without an equal, and it is not unlikely that we do use more remedies prepared from indigenous plants, than other schools.

Modern Eclecticism's most characteristic and distinguishing tenet is "Specific Medication." Thirty-five years ago, Dr. John M. Scudder wrote "The medicine of the future will be direct or specific," and published those little masterpieces, "Specific Diagnosis" and "Specific Medication;" and Eclectics recognizing it to be the most rational method of prescribing, began testing and proving the system, till to-day, ten thousand physicians are successfully practicing Specific Medication.

The prejudice against this system is due to the fact that it is generally misunderstood. Eclectics do not advocate or administer specific remedies for specific diseases, such as a remedy or combination of remedies for pneumonia, typhoid fever, dysentery, etc., but do prescribe specific remedies for specific pathological conditions.

Every change from the normal, or every pathological condition gives expression to such change by symptoms, and experience has proven that the *same* pathological change is always expressed by the *same* set of symptoms, and having once learned to recognize such a condition, we have it for all time. Thus an excess of heart power as seen in *sthenia*, is *always* expressed by the full bounding pulse. Irritation and excitation of the cerebral centers in all *sthenic* conditions, is *always* evidenced by a flushed face, bright eyes, and contracted pupils. The pallid tongue with a white pasty coating *always* tells of acidity, while the dry, red tongue *always* tells of alkalinity of the blood. So, of

every deviation from health, each change is expressed by definite symptoms. Now there is a direct relation between drug action and disease expression, and having once learned this relation or the affinity that a remedy has for a specific condition, we have learned it for all time. Thus, if *veratrum* will influence the heart's action to-day, when there is a full bounding pulse, and this is the basal lesion, it will do it under the same conditions to-morrow, next year, or a hundred years hence. It will do it in pneumonia, in cerebritis, in nephritis, or wherever it is found. If *gelsemium* will relieve irritation of the cerebral centers, as shown by the flushed face, bright eyes, and contracted pupils, no matter what the disease, we have found the affinity or drug relation for this condition. So of every pathological change, and the diagnosis, so far as *treatment* is concerned, consists in determining the *pathological condition present*, rather than in naming the disease. While I recognize the importance of being able to diagnose the disease in its entirety, and believe that the best diagnostician, other things being equal, will be the most successful in the treatment of his patients, at the same time it were better for the doctor if he can *forget* that his patient has typhoid fever, pneumonia, dysentery, or whatever he may have, and study the *conditions* that are present. This may be wrongs of the circulation, of the nervous system, of the secretions, of digestion, of assimilation, or wrongs of the blood, but whatever the basal lesion, it must be overcome if the patient is to be benefited by medication. I appreciate that it may not always be possible to recognize the pathological condition, but until we do, we can not hope to treat our patient in a rational manner. This, then, is Specific Medication—Specific Remedies for Specific Conditions.

We are indebted to a host of able workers, pioneers in the field of rational medication, and who builded better than they knew. Especially are we indebted to Prof. John M. Scudder, who by pen and voice directed our school in this better way; to Prof. John Uri Lloyd, whose work in giving us Specific Medicines of such superior quality as to make success possible; to my colleagues and fellow practitioners who have so largely assisted in more firmly establishing the principles of Specific Medication.

For the benefit of students and those who are not familiar with Eclectic methods, I have added a chapter on the indications of remedies, and also poisons and their antidotes, together with a table of weights and measures, and a list of incompatibles.

PART I.

INFECTIOUS DISEASES.

TYPHOID FEVER.

Synonyms.—Typhus abdominalis; Typhus nervosus; Ileotyphus and Autumnal Fever, are the most common terms, although Murchison's list includes forty others.

Definition.—An acute, infectious disease, derived from a specific cause and characterized pathologically, by inflammation and generally by sloughing of Peyer's gland, swelling of the mesentery and engorgement of the spleen.

Clinically, by a slow fever of gradual invasion, lasting from three to six weeks, a rose colored eruption, diarrhea, tympanites and a characteristic delirium, typhomania.

History.—This is the most universal of all fevers. It is not confined to any country or climate; to any age, sex, or condition. Wealth has no power to bribe or beauty to charm this insatiable foe. Wherever civilization has made its way, there typhoid fever has been an unwelcome guest. Although its authenticity does not date back of the present century, we have every reason to believe that it can be traced to prehistoric times.

In 1813, Bretonneau of Tours recognized this fever as differing from other continued fevers and termed it Dothinentérite, while Petit termed it Enteromesenteric fever. In 1829, Louis offered the name Typhoid, but it remained for Gerhard, of Philadelphia, a student of Louis, to distinguish between typhoid, and typhus as separate and distinct diseases. He published his views in the February number, *American Journal*, 1837. Drs. E. E. Hale and James Jackson, Jr., of Boston, also students of Louis, corroborated the observations of Gerhard, and typhoid fever was recognized, especially in America, as a distinct disease. In Europe, however, there was still doubt as to its identity, many

believing that the two were only different phases of the same disease.

Stille, of Philadelphia, who was house physician to Gerhard, assisted largely in making clear to the people of France the distinction between the two diseases, during his careful study of typhoid while in Paris.

Shattuck, of Boston, visited the London fever hospital, studied the disease in all its minutia, which he carefully tabulated and presented to the Societe Medicale d'Observation. These observations were accepted by prominent writers from various countries, and since 1850 there has been a general acceptance of the truth, that typhoid fever is a distinct disease. It will be observed that to America belongs the honor of isolating one of the most common and prevalent of all fevers.

Etiology.—The predisposing causes are twofold. On the one hand are all the conditions that favor the growth of the infecting material and its accumulation. On the other hand are all the conditions that impair the vitality of the individual, rendering him susceptible to the poison.

Age.—One of the most frequent predisposing causes is age, over seventy-five per cent of its victims being between fifteen and thirty years of age. It was formerly believed that children were exempt, but since Murchison, in 1864, presented to the London Pathological Society the intestines of a child six months old, who had died from the disease, all doubt has been removed, and nearly every physician of experience can bring his own evidence to substantiate the fact, that from infancy to old age there is no exemption.

Sex.—Some have tried to prove that males are more prone to the disease than females, but the cause is rather to be found in the fact that men are more exposed to the infection than women, and not to any difference in the sexes.

Season.—Typhoid fever prevails most frequently in the fall, hence the term Autumnal Fever. Hirsch found that of five hundred epidemics twenty-nine occurred in the spring, one hundred and thirty-five in summer, *two hundred and fifteen* in the fall, and one hundred and forty in the winter.

Weather.—The condition of the weather plays some part as a predisposing factor in this disease. Hot and dry seasons favor it, while cold and wet seasons tend to check it.

Exciting Cause.—The exciting cause is now generally recognized by the medical world as being due to the entrance into the system, of one susceptible to the poison, of a specific germ, the bacillus of Eberth, which he has termed the bacillus typhosus. These micro-organisms, taken into the system through the digestive tract, when not destroyed by the acid of the stomach, pass into the alkaline constituents of the intestine, where the conditions are favorable for their multiplication and development.

The bacilli penetrate the solitary follicles and Peyer's patches, and there form colonies. These migrate by way of the lymphatic vessels to the mesenteric ganglia, and by way of the radicles of the superior vein to the liver, to be finally distributed by the blood current to the spleen and other organs. Such is the view held by a large part of the profession. That these bacilli are found in the contents of the intestine, the stools, in the urine, in the mesenteric glands and spleen, none can deny, although many contend that they are the result, rather than the cause, and that the toxins are not generated from the micro-organisms. Of these doubters the most prominent authority on fevers is Murchison. Unfortunately they are unable to furnish a tangible substitute to take the place of the specific germ. The life of this bacillus is very tenacious. (See frontispiece.)

Pruden found that after being frozen for over three months it was capable of growth, and that it maintained its vitality after being heated to a temperature of 132 C., and that after repeated freezing and thawing its vitality was unimpaired.

Modes of Conveyance.—While it is possible to receive the poison by inhalation, by far the most frequent mode of entrance is through the digestive tract in eating and drinking. Contaminated water ranks first as a carrier. Of two hundred epidemics that were studied, polluted water was found to be the source of infection; only two will be named, however, to show the direct relation to this source.

In 1885, in Plymouth, Pa., twelve hundred persons, out of a population of eight thousand, were attacked with the fever. The water supply was taken from a reservoir which received its supply from a mountain stream, upon the side of which resided a typhoid fever patient. During the months of January, February, and March the stools were emptied near the banks of the stream that supplied the city with water. Typhoid fever at

the rate of fifty cases per day broke out, and did not cease until the number reached twelve hundred.

In 1898, at Maidstone, England, an epidemic occurred, in which eighteen hundred cases out of a population of thirty-five thousand could be traced directly to contaminated water.

Milk.—Milk is also a common carrier of the infecting material, although nearly always the result of polluted water being used, either in diluting the milk or in washing the cans. Several epidemics have been traced to this source in France.

Oysters.—Articles of food may also contain the poison; notably, oysters, more than one hundred cases being attributed to the luscious bivalves, which had been fattened on contaminated water.

Dr. Conn, of Middletown, Conn., traced the cause of the epidemic which prevailed among the students of Wesleyan University in 1894 to this article of diet. The oysters came from a creek where they had been fattened by being kept in brackish water, the oyster-bed being only three feet from the mouth of a sewer which emptied the contents of two typhoid fever patients. Students from Amherst College, who received oysters from the same locality, also developed typhoid fever. The oysters were eaten raw in every case. Thus we find that polluted water, either directly or indirectly, is the common carrier of the infection, whatever that may be.

Pathology.—The lesions resulting from this fever may be divided into two parts. First, those which are primary and distinctly characteristic; viz., the lesion of the intestinal canal, Peyer's patches, the solitary glands of the ileum and cecum, and more rarely of the colon and rectum, the mesenteric glands, especially those opposite the ileum, and changes in the spleen. Secondly, those resulting from sepsis occurring during the long period of fever, and affecting the tissues and organs at large.

The lesions of the intestines are better described under four stages, infiltration, necrosis, ulceration, and healing. The first effect of the poison, typhotoxin, bacilli, or whatever it may be, is to cause hyperemia of the lymph follicles; the capillaries become engorged, cell infiltration proceeds till the glands extend from an eighth to a quarter of an inch from their base, the solitary glands varying from the size of a small bird-shot to that of a

small pea. The follicles most involved are those in the lower third of the ileum and the upper part of the cecum, although the follicles of the entire tract may be involved. The infiltration reaches its height by the eighth or tenth day, when it terminates by resolution or death. In the milder cases, by resolution, the follicles undergo fatty or granular degeneration, and are carried away by the absorbents, during which process there may be slight hemorrhages. More frequently, however, the infiltration is so excessive that resolution can not take place, the capillaries become engorged and choked by infiltration, and necrosis and sloughing follow.

A gland may have several necrotic spots with mucous membrane intervening, or an entire patch may be involved. The necrosis is variable, depending upon the severity, sometimes involving only the mucosa or sub-mucosa, again extending to the muscular and serous coats. This stage occupies eight or ten days, and is followed by the stage of ulceration.

The ulcers are shallow or deep according to the amount of necrosis or sloughing. The ulcers of the solitary glands are round, while those of Peyer's patches are irregular and ragged. Where the ulcers extend to the deeper portion of the bowel, hemorrhages result. Perforation may follow, although a rare condition.

This stage is followed by healing or cicatrization; granular material forms in the bottom of the ulcer; the mucous membrane of the edges project; the glands with their epithelium reform, and the bowel is restored to its normal condition.

The mesenteric glands undergo similar changes—viz., hyperemia, necrosis, and ulceration—those opposite the lower third of the ileum being more often involved. They vary in size from that of a pea to a walnut. The spleen in nearly all cases is early involved. Congestion early takes place, followed by softening.

It is difficult many times to separate the secondary from the primary lesion; in fact, in some cases we get the tissue changes first. The system is so profoundly impressed by the poison that there is very early a degeneration of tissue. The liver becomes hyperemic, swollen, and soft, which may be followed by abscess formation.

Cloudy swelling, with granular degeneration, takes place in the kidneys. There may be ulceration of the larynx, while the

congestion of the bronchial mucous membrane is shown by an irritable cough.

Congestion of the lungs is a very common and serious complication. The heart shares in the general infection, although pericarditis and endocarditis are rare, myocarditis is not uncommon, the cardiac muscles become weakened, and the much dreaded heart-failure is to be early combated.

Symptoms.—*Incubation*—This stage is of several days' duration, from seven to twenty-one or more. The symptoms are those of depression; the patient feels languid, and complains of feeling tired, although there be no exertion. His rest is disturbed at night, and he rises unrefreshed, as weary as when he retired; the appetite is impaired, the tongue is generally coated, and the bowels are slightly constipated; he complains all the time of being tired and of having more or less headache. Bleeding from the nose may occur for several days. These symptoms increase from day to day until the period of invasion is ushered in.

Many times it is difficult to draw the line between the period of incubation and that of invasion, so gradually does the one run into the other. While the chill may be pronounced, at other times slight chilly sensations are the only evidence of its appearance. Epistaxis is common and affords slight relief to the headache so often experienced; the temperature has been slightly above normal for several days previous to the chill, but now reaches 101 or 102, and the patient is now fully entered upon his long siege of fever, which is to be characterized by daily remissions.

The pulse varies, is full and frequent, although soft, or quick and sharp, if there is much nervous irritation. There is evidence of depression even in the early stage; the face is slightly flushed, the eyes heavy and expressionless, the tongue is moist and dirty, the appetite is gone. The skin, at first, becomes moist and somewhat clammy, with an unpleasant odor. The bowels at this time are usually constipated, although if active cathartics have been used diarrhea early ensues; the urine is but slightly lessened in quantity, and as the disease progresses, it becomes slightly increased, and is pale and frothy, resembling new made beer.

The temperature gradually increases, during the first week being about one degree higher in the evening than in the morning. From the seventh to the tenth day the characteristic rash, rose-colored, appears on the abdomen and chest, and although this is

regarded as one of the chief diagnostic symptoms, it may be absent altogether. The diarrheal, frothy, "pea-soup" discharges may begin as early as the sixth or seventh day, or it may be delayed until the third week, although usually the second week finds the stools frequent and offensive.

If there be much nervous irritation, the delirium may be active during the early stages, occurring mostly at night and disappearing with the approach of day; most frequently the delirium is of a passive character, and typhomania is a characteristic symptom.

The abdomen has been drummy from the invasion, with gurgling in the right ileac region, and by the second week tympanites is a marked feature. At this time there may be a temporary paralysis of the bladder, and the patient passes his water involuntarily; or, on the other hand, there may be retention, when the catheter affords the only relief.

From the tenth to the twentieth day the evidence of sepsis grows more pronounced; the tongue becomes dry, brown, and heavily coated, or sleek and glossy, while sordes appear on teeth and lips. The loss of tissue is rapid and emaciation marked. The pulse has now become dicrotic; the disturbance of the nervous system is complete, and we witness subsultus tendinum and carphology. If ulceration is severe, hemorrhages occur, followed by a drop in temperature and great prostration. The extremities are inclined to be cold, the heart feels the strain, and the depression is great. The position is dorsal.

In the more favorable cases, the disease has spent its force by the eighteenth to the twentieth day, the temperature declines, the stools are less frequent, the tongue becomes moist and clean, appetite ferocious, and the patient enters the convalescent stage. This may be delayed, however, to the twenty-eighth, thirty-fifth, or even forty-second day.

Temperature.—There is a gradual rise in temperature during the first week, and if the forming stage is of long duration, the patient goes to bed with a temperature of 100° . Each day, for four or five days, we notice a slight increase from one degree to a degree and a half, the evening temperature being higher than the morning. These daily remissions are pathognomonic of typhoid fever. From the fifth to the seventh day the temperature reaches 104° or 105° . During the second week it is quite uniform— 103° or

103.5° in the morning; 104° or 104.5° in the evening. The temperature, gradually rising from the noon hour, reaches its maximum between six and eight, remaining there until midnight, when there is a gradual decline till six or eight in the morning, when it reaches its minimum, remaining thus till nearly noon, when there is a repetition of the previous day.

During the third week there is a slight decline, and by the twenty-first day, in the mild cases, the temperature is normal in the morning, although the rise in the evening temperature continues for several days. In severe cases the remissions are very slight, from the fifteenth to the twenty-fifth day the fever being very uniform, with an occasional increase of the morning temperature over the evening temperature. During the decline the remissions are more marked, there being a fall of from two to three degrees from morning till night, and where the emaciation and prostration have been extreme it is not uncommon to find a sub-normal temperature in the morning for several days of the convalescent period. The severity of the disease and its duration is determined, as a rule, by the temperature range; when this is low the fever is mild, the disease increasing in severity as the temperature rises. We meet some cases where the temperature never rises above 102° or 103°.

A disease which shows as much systemic infection as typhoid, would naturally show more or less wrong of every organ and tissue of the body, and while this is true, there are some parts more frequently affected than others, notably the respiratory, nervous, and gastro-intestinal systems.

Bronchitis.—The toxin may early infect the bronchial mucous membrane, giving rise to bronchitis. The breathing is more hurried, and there is a sense of constriction of the chest, attended by a frequent hacking cough. Expectoration is at first scanty, and the mucus is raised with difficulty; but gradually the secretion becomes more free, often resulting in bronchial catarrh. The sibilant rhonchus, together with the symptoms already noted, enables us to recognize this lesion.

Pneumonia.—Congestion and inflammation of the lungs are not infrequent, and may occur during the second or third week, rarely in the first. The breathing is short and rapid, the oppression of the chest is marked, and the cough is harassing, greatly depressing the patient. The expectorated material is usually not

TYPHOID FEVER.

Plate 2.

Typical typhoid curve. "Anders."

so viscid and tenacious as in simple pneumonia, nor the sputa so rusty, being more of the prune-juice color.

The dark, dusky hue of the lips and tongue, the flushed face, oppressed circulation, dullness on percussion, and crepitant rhonchus, are symptoms that can not be mistaken. This is one of the most serious complications, causing great prostration, and rendering the prognosis problematical. The congestion is most frequently due to the dorsal position, and not from taking cold nor from germ infection.

Gastro-Intestinal.—In some cases we notice, at the beginning of the fever, marked wrongs of the stomach. The tongue is heavily coated with a dirty, pasty coating; there is loss of appetite, nausea, and weight in the region of the stomach. There is hypersecretion of mucus, and food and medicine are not appropriated. The fever is of low grade, the pulse weak, and temperature not over 102° or 103° . Although the prostration is great, emaciation is not so marked. The extremities are inclined to become cold. In such cases convalescence is delayed to the fifth or sixth week.

In other cases there is great irritation of the stomach, and the enteric lesion is greatly aggravated. Diarrhea is a prominent feature, the stools being frequent and offensive. Tympanites is extreme and hemorrhage may be expected.

Cerebral Complications.—In some cases the nerve centers are the first to feel the effect of the poison, and the disease is ushered in with intense headache or neuralgia, and if the physician is not careful, he will overlook the real lesion. All the symptoms are increased in intensity; the skin, especially of the head and face, is intensely hot and pungent. The countenance is flushed; there is throbbing of the carotids; the pulse is rapid, full, and strong; the breathing is frequent and suspirous; the eyes are injected and suffused, or dry and burning. There is great irritability and restlessness, giddiness, intolerance to light and sound, with greatly increased sensibility.

Within forty-eight to seventy-two hours delirium of a wild and active character occurs, which is soon replaced by coma vigil, subsultus, and lastly by profound coma. At other times the cerebral affection is intense; profound stupor speedily makes its appearance, accompanied by a slow, oppressed, and intermittent pulse; or the patient is dull from the first, the pupils are dilated, the patient answers slowly, protrudes his tongue with difficulty,

and is careless of the result. The pulse is feeble, skin cool, temperature not very high, delirium low and muttering, which is soon replaced by coma.

Laryngitis and Pharyngitis.—Occasionally we meet with these complications; the constriction of the throat, difficult deglutition, and change of voice enables one to recognize the lesion.

Heart.—We meet with cases where the circulatory apparatus feels the force of the poison, and, although rare, an endocarditis or pericarditis results. A myocarditis occurs more frequently.

Afebrile Typhoid Fever.—This form is exceedingly rare. Some eight or ten years ago I treated one of our students with this form, the temperature being sub-normal the greater part of his three weeks sickness.

Typhoid in Children.—The disease as seen in children needs no especial description, except to say that the onset is frequently more sudden. There is a short forming stage, and the fever runs a shorter course, the patient often being convalescent the fourteenth day.

Diagnosis.—The diagnosis is usually not difficult, although in rare cases it may be uncertain for several days. Osler states that, in four or five cases in his series, the diagnosis was not made until autopsy.

The history of the forming stage: one, two, or three weeks of listlessness, languor, headache, loss of appetite, general depression, progressively increasing until the patient takes his bed, are the most characteristic symptoms of this fever; and the regular step-ladder rise in temperature with daily remissions, the peculiar dullness of intellect, the marked prostration and feeble pulse, are sufficient to render a most probable diagnosis. If to this we add tenderness and gurgling in the right ileac region, enlargement of the spleen, diarrhea, the presence of the rash and the cerebral disturbance, the diagnosis is complete.

The case difficult to recognize, is where the usual symptoms are masked by an early complication. A recent case serves as an illustration. The invasion was characterized by an intense headache and great irritation of the nervous system; his face was flushed, pulse full and hard, eyes bright and contracted, and his constant cry was for relief from the pain in his head. The symptoms were more of meningitis than typhoid.

Sometimes the respiratory complication is the first to attract the physician's attention, and if we are not careful we will give a mistaken diagnosis. In all such cases the physician must not be in too great haste to name the disease. If we examine our patient carefully, note the tenderness on pressure of the abdomen, the daily remissions in the fever, the evidence of sepsis as shown by the tongue, light will soon be forthcoming even in obscure cases.

I have but little faith or patience with the modern search for the bacillus typhosus as a means of diagnosis, nor with the serum test as proposed by Widal, which is as follows: To a drop of blood taken from the patient by pricking the finger with a needle, add a few drops of bouillon culture of the bacilli. In a short time, from a few seconds to five hours, the bacilli lose their peculiar movements and collect into heaps, and gradually into lumps, which, if examined in hanging drops, are visible to the naked eye. The blood serum of healthy persons, or persons suffering from any other disease, does not have this effect upon the typhoid culture.

Vaughan, in an article on ptomains, toxins, and leucomains, says of the Widal test: "There are reasons for believing that too much reliance has been placed on the Widal test, and that normal blood serum will often have a similar effect upon the typhoid bacillus, and that the difference in behavior between the typhoid and cholera germs toward the blood serum of typhoid patients is not so marked as has been generally believed." We thus see that we must depend upon the clinical examination of our patient, rather than upon the microscopic or chemical reaction.

Prognosis.—This is a disease that varies greatly at different times and in different seasons. Some years it assumes a mild character and but few die, while again it assumes a most malignant form. The mortality is usually larger in hospitals than in private practice. If modern Eclectic treatment be carried out, the mortality should not be over three to five per cent. If there be severe hemorrhages, pneumonia, or peritonitis, the prognosis should be guarded.

Treatment.—In the treatment of typhoid fever, Eclectics have been remarkably successful, the mortality having been reduced to five per cent or less, and, with the modern care in nursing, the mortality will be still further reduced.

Prophylactic.—While we believe that the direct or specific medication employed by our school shows the best results, we also firmly believe in using every known means to prevent the further spread of the disease, and at the same time minify the toxin that is destroying the vitality of our patient. Since the infection is conveyed most frequently through polluted water, our first care should be in this direction. If an epidemic is prevailing, the attention of the health department will be drawn to the water supply. This will not, however, release the attending physician from all responsibility. He must insist that all water be boiled before using. The milk should also be treated in the same way, as we have seen that this is a fruitful means for carrying the poison.

"Cleanliness is next to godliness" was a favorite saying of Dr. Scudder, and he would add, "In some diseases, better." This is certainly important in typhoid fever. Dirt is a fruitful soil in which the poison thrives and multiplies, and hence we must see that the patient be kept perfectly clean. The bed linen should be changed daily, as well as the night dress. After each stool the soiled parts should be sponged with an antiseptic solution. Platt's chlorides or a solution of carbolic acid 1 to 50 is very efficient.

The secretions, both urine and stool, should remain in a chloride-of-lime solution one hour before being emptied. The solution can be made by adding six ounces of pure chloride of lime to one gallon of water. The porcelain bed-pan should be thoroughly scalded after each using, and a cup of the lime solution placed in it to remain until it is again used. To each stool enough of the solution is added to completely cover it. After standing one hour, it should be emptied, if in the country, in a trench, dug for the purpose, being careful that it does not drain in any direction of the water supply. If vomiting occurs, the ejected material should be treated in the same way, as should the expectorations, unless cloths are used, when they should be burned. The soiled linen, after lying in some strong antiseptic fluid, should be thoroughly boiled before using.

These precautions may seem unnecessary to many, but as a school we have not paid as much attention to these matters as the times demand. This is an age in which antiseptics are demanded, and to fail in our attentions along this line is to court defeat. When possible—and I realize that many times it is not—

the patient should be placed in a large room, where good ventilation can be secured, and where the sun can be admitted at some time during the day. An open fireplace is desirable. The temperature of the room should be maintained at sixty-five or sixty-eight degrees.

Much depends upon a good nurse, not necessarily a trained one, but one of good judgment, who will carry out instructions. The attendant should be gentle, but positive. Our patient must be put to bed early; and kept there. Much may be lost by allowing the patient to walk about during the early days. He is in for a long siege, and can not afford the unnecessary loss of a single ounce of his strength; hence a bed-pan should be used. He may object to it at first, insisting that he can not use it; but if the nurse be firm, he is soon convinced of his error. If impossible, which is rarely the case, he should be carefully assisted to the commode, which should be placed by the bed.

He is to be sponged daily with soda-water if the tongue be white and pasty, or acidulated water if it be red and dry. This is for cleanliness, not as a temperature reducer, which will be noticed later. The diet should be fluid, preferably milk, and should be given about every three hours, unless there be great prostration, when it may be given every hour. If the patient objects to sweet milk, it can be peptonized by adding essence of pepsin, or make a sherry whey by adding one-fourth of a cup of sherry-wine to three-fourths of a cup of hot milk, stir till it curds, strain, and add a little sugar. This is a favorite whey, and I find it acceptable to many; others prefer buttermilk, while again malted milk, which may be prepared in many ways, will answer better. Broths do better in the advanced stages of the disease; if used early they are apt to aggravate the diarrhea.

Sick people soon tire of one food, and it is a good plan to change the broth from time to time; say beef broth one day, lamb broth another; then change to clam or oyster broth, or chicken broth, when we may return to the beef broth. Give plenty of cold boiled water. If he does not ask for it, give it as a medicine; it will help nature wash out the poison by way of the kidneys. Do not allow any solid food until the temperature becomes normal and all tenderness disappears from the abdomen.

The position of the patient must be changed occasionally to prevent bed-sores.

In the giving of drugs in this disease, as in every other, it is well to bear in mind the object of our medication. We are to remember that our patient is to contend for weeks with a febrile condition that will tax to the utmost his vitality; that the fluids of the body and of every tissue and organ will be impressed by the poison; that every agent that is given must tend to conserve his vitality, and that every remedy that depresses it must be discarded. We are to guide our fever patient safely through the troubled sea of fever, render him as comfortable as possible, and so modify the morbid processes that may arise, that the voyager may safely reach the desired haven, health.

While we recognize that this is a true zymotic disease, with the intestines bearing the brunt of the attack, we do not treat it entirely by antiseptics. We most heartily concur in the teaching of Dr. Scudder in regard to the use of sedatives in this disease. An experience of twenty-five years convinces us of their beneficial action. We are aware of the fact that the fever is the result of a toxin in the blood, and that theoretically the treatment should be to give agents to neutralize or antidote this poison; at the same time we are satisfied that the fever may be modified, the irritation of the nervous system better controlled, and the secretions promoted by their judicious administration. We may not succeed in materially lowering the temperature, but we most favorably influence the heart's action and fortify it, so that it may withstand the strain that it is always called upon to bear. Sedatives may be given to improve the circulation.

Aconite.—This is the sedative where the pulse is small and frequent, an evidence that the heart's action is weak and is beating rapidly to make up for loss of power. Aconite in the small dose does not depress, but adds tone to the heart. In proportion as the circulation is controlled, the secretions from the skin and kidneys are increased. Echinacea possesses strong antiseptic qualities, and may be combined with it—thus:

R Specific Aconite.....	gtt. v.
Specific Echinacea.....	3ss to i.
Aqua Dest.....	3iv. M.
Sig. Teaspoonful every one or two hours.	

Veratrum.—Although there is usually debility with this fever, we occasionally find the strong, full pulse, showing excessive

heart's action, and here veratrum takes the place of aconite. With excess of the heart's power, there is generally great irritation of the nervous system, which gives us the flushed face and bright eyes calling for gelsemium. Here the prescription will read:

℞ Specific Veratrum.....gtt. x to xxx.
 Specific Gelsemium.....gtt. x to xv.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every two or three hours.

Rhus.—This is an agent to relieve irritation, either of the nerve centers or an irritable stomach. These conditions are present with the small, sharp pulse, and if the tongue be pointed with elevated papilla the indications are still more pronounced:

℞ *Rhus. Tox.*.....gtt. viii.
 Aconite.....gtt. v.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every hour.

Lobelia.—This is an excellent drug where there is an oppressed pulse, as if there was some obstruction to the free flow of blood. In addition there is a sense of oppression in the chest, difficult breathing and unpleasant sensations in the region of the heart. These are symptoms often found with respiratory complications. Here specific lobelia, gtt. x, is added to the aconite solution above named.

Jaborandi.—Where the skin is dry and the temperature running high, Dr. Webster recommends Jaborandi:

℞ Specific Jaborandi.....ʒi.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every one, two, or three hours.

Bryonia.—Where there is bronchial irritation, with harassing cough, with sharp chest pains, and where the pleura is involved, bryonia is especially valuable. With these conditions the pulse is usually vibratile:

℞ Specific Aconite or Veratrum.
 Specific Bryonia.....gtt. v to viii.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every hour.

Antipyretics.—For the high temperature, the temptation is to resort to some of the many antipyretics, chief among which are the coal-tar products, and quinine. These should never be used. The patient is being constantly depressed by the disease, and if to his depression we add remedies that are recognized by all medical men as heart depressants, our patient must necessarily suffer.

Baths.—To assist the action of the sedatives, baths are the safest adjuncts in reducing the temperature. The early Eclectics used the wet-sheet pack with great success, and we would do well to revive this practice. The Brand treatment, the submerging of the patient in cold water every time the temperature reaches 103, is not practical in private practice, but there are none so poor where the wet-sheet pack could not be used. Frequent sponging may take the place of the pack, and will be found very useful. Tepid water is the best.

Antiseptics.—Very early, antiseptics may be indicated. The dusky hue of the mucous membrane tells of the progress of the poison, and suggests echinacea and baptisia. Where the tongue is broad, full, slightly coated, and with a dusky hue, face and tissues full, give:

℞ Specific Echinacea.....ʒi.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every hour.

Baptisia.—Where the face is dusky and presents a frozen appearance, the tongue is dusky and the stools frequent, baptisia may take the place of echinacea, or, what would be better, combine them.

Sodium Sulphite.—Where the tongue is moist, dirty, and pasty, the face full, eyes dull, extremities inclined to be cold, emaciation not very rapid, a saturated solution of sulphite of soda will be found invaluable. Tablespoonful every two hours.

Potassium Chlorate.—This is the remedy for bad odors, offensive skin and breath, fetid stools; in fact, general cadaveric odor:

℞ Potassium Chlorate.....ʒi.
 Aqua Dest.....ʒiv. M.
 Sig. Teaspoonful every two hours.

TYPHOID FEVER.

Plate 3.

Curve in severe typhoid. "Anders."



Hydrochloric Acid.—This is by far the most frequently indicated antiseptic used in typhoid fever. By the end of the second week, and sometimes earlier, the tongue becomes dry and brown, or, dry, sleek, and glossy, with sordes on teeth and lips. The tongue is protruded with difficulty, the emaciation is rapid here:

℞ Hydrochloric Acid.....gtt. xv to xx.
Simple Syrup.
Aqua Dest.....aa ℥ii. M.
Sig. Teaspoonful every one, two, or three hours.

Cider.—With these same symptoms, sharp, sparkling cider is not only very refreshing, but also curative. Buttermilk is another agent that is grateful in these conditions.

Sulphurous Acid.—The moist, dusky, red tongue, resembling spoilt beef, calls for sulphurous acid.

℞ Sulphurous Acid.....℥ii.
Aqua Dest.....℥ii. M.
Sig. Teaspoonful every two or three hours.

Nervous System.—We find that one of two conditions may be present. Where the patient is restless and irritable, gelsemium and rhus tox. will be called for; here the flushed face, bright eyes, hot head, and restlessness, calls for gelsemium. If the patient suddenly starts in his sleep, has a sharp stroke to the pulse, rhus has the preference.

Belladonna.—If there is more or less coma, the pupils will be dilated, the pulse will be small and the extremities inclined to be cold,—we will add ten drops of specific belladonna to a half a glass of water. Teaspoonful every hour.

Quinine.—We do not use quinine as an antipyretic, but where there is lack of innervation, with moist skin and moist tongue, quinine is an excellent agent:

℞ Quinine.....grs. ii.
Phosphate Hydrastis.....grs. ¼ M.
Sig. A capsule every three or four hours.

Insomnia.—The patient who fails to secure sleep is doing badly, as the dry, brilliant eye, pinched features, and contracted nose will testify.

Passiflora.—*Passiflora* in full doses will often secure the desired rest:

℞ *Passiflora*.

Aqua Dest.....aa ʒi. M.

Sig. Teaspoonful every one, two, or three hours.

Diaphoretic Powder.—The old diaphoretic powder of the fathers, consisting of camphor, opium, and ipecac, is one of the most reliable remedies which can be used. The indications calling for it are, moist skin and tongue. From five to eight grains should be given every four or five hours. The second dose rarely has to be given.

Sulphonal and Trional.—These agents may be given in ten-grain doses, administered in very hot water. It is best dissolved in boiling water, then stir till cool enough to drink. The sulphonal should be given two hours before sleep is desired, as it is very slow in its action. Trional is much quicker, and should be given thirty minutes before bedtime. Before using any of these drugs, the nurse will have tried sponging the face in cologne-water, rubbing the spine, using the hot foot-bath, changing the pillows, etc., which will, very many times, secure the desired result, sleep and rest.

Gastric Complications.—Wrongs of the stomach should have been considered, perhaps, before lesions of the circulation; for many times treatment has to be directed to correcting this before any other medication can be carried out.

Irritation.—The irritable stomach will be easily recognized. The elongated tongue, reddened at tip and edges, tenderness over the epigastric region, the constant nausea with persistent retching, will be overcome by the use of specific ipecac and rhus tox.—five to ten drops of each to a half a glass of mint water. Teaspoonful every thirty or sixty minutes; or sub-nit. bismuth, drachms i to water four ounces.

A cold pack over the stomach will assist materially in overcoming this condition. An infusion made from the bark of the young twigs of the peach-tree, and given in small doses, may also be very useful.

Atony.—At other times there is marked atony of the stomach with hypersecretion of mucus. Here the tongue is broad and

pallid, with a heavy coating from base to tip. The patient is dull, and the tissues full.

Sodium Sulphite.—Until these conditions are changed, neither medicine nor food can be appropriated. With these symptoms place sulphite of sodium, drachms ii, in a half a glass of water, and give a teaspoonful every two or three hours.

Diarrhea.—If mild, nothing will be required, but if profuse, sub-nitrate of bismuth or subgallate bismuth will be useful, three to five grains every three or four hours; or specific epilobium, ipecac, or dioscorea may be given, ten to twenty drops in a half a glass of water. If the tongue be pasty, sulpho carbolate of zinc will be found of great benefit.

Hemorrhage.—There will be few cases of hemorrhages, if the doctor has carefully met the conditions from the beginning; however, we will sometimes have it even under the best of care. Gallic acid, five grains every three or four hours, will usually promptly arrest it. The decoction of erigeron cana. is advised by Webster. There is usually great prostration following a hemorrhage, and stimulants will be called for, strychnia grs. 1/60 being one of the best.

Tympanites.—If the distention of the abdomen be great, the small dose of turpentine will be found useful. The tongue in these cases is dry and clean. An emulsion containing one drop of the drug at a dose, every two hours, will not disturb the stomach or kidneys, and will give good results. Specific xanthoxylum, gtt. xx, to water four ounces, teaspoonful every hour, is good treatment. The common tincture of Prickly-ash berries, an ounce to a pint of warm water, and used as an enema, will also prove of marked benefit in stubborn cases.

Constipation.—I am not yet a convert to cathartics in typhoid fever, and I am persuaded that a little constipation is better than the irritating effect of a cathartic. I would allow the bowels to remain quiet twenty-four or forty-eight hours before resorting to means for an evacuation, when an enema of warm water and glycerine may be used. If unsuccessful, tablespoonful doses of pure olive-oil or broken doses of epsom salts may be given.

Bladder.—The condition of the bladder must be carefully looked after, for the patient may have retention and the nurse overlook it for several hours. If urine has not been voided for twenty-four hours, small doses of santonine may be used. Strych-

nia, 1/60 gr. every three or four hours is also an excellent agent. If there be much distention of the bladder, the catheter, of course, must be used.

Convalescence.—Great care must be exercised during convalescence; as the fever subsides and the tongue cleans, the patient develops a voracious appetite, and, if the nurse be not firm, will take more than can be digested. The nurse should give nourishment frequently and in small quantities, rather than the usual meals, three per day. As the strength is regained, the patient may be assisted about the room, but should not undertake to walk far till the stools become normal and the heart's action has regained its tone.

TYPHUS FEVER.

Synonyms.—Famine Fever; Ship Fever; Jail Fever; Hospital Fever; and Putrid Fever.

Definition.—An acute, infectious fever, endemic and also epidemic, where great masses of people are congregated without regard to proper sanitation. It is characterized by a sudden invasion, high grade of fever, a peculiar rash, great nervous derangement, and terminates in from twelve to sixteen days by crisis.

History.—According to Murchison, to study the history of typhus fever would require an historic study of Europe for three hundred and fifty years, during which time severe epidemics have proven more destructive than war. Until the latter half of the present century but little attention was given to sanitation, in the army, on shipboard, in jails, prisons, or even in hospitals; hence the great loss of life; but the great improvement of modern sanitary regulations is rendering the disease less dreaded and far less fatal. Typhus fever is still epidemic in Ireland, England, Poland, Russia, Hungary, and Italy.

In 1807 the fever appeared in the New England States, and visited each in rapid succession. In 1812 it appeared in Philadelphia, and again in 1836, in 1865, and in 1883. New York was visited in 1881, 1882, and 1893 by epidemics of this fever. In all of these epidemics the disease sustained its reputation as the deadly typhus. Since 1893 but few cases have been reported,

and, with improved sanitation and the rigid quarantine regulations adopted by this country, typhus fever will soon have only an historic interest for the American physician.

Etiology.—The predisposing causes are, filth, poverty, and overcrowding, without due regard to cleanliness, especially in regard to the removal and destruction of human excreta.

Intemperance, one of the most fruitful causes of poverty, weakens and saps the vitality to such an extent that its victims readily succumb to typhus. Poor food naturally makes poor blood, and poor blood is a soil where toxins flourish and multiply.

Exciting Cause.—The specific cause has not yet been isolated, although undoubtedly similar in character to that of other infectious diseases, and when once it finds entrance into the system of one susceptible to the poison or germ, it has the power of multiplying and reproducing the original toxin. Although highly contagious, the infection has but a short range and only those in close contact with the patient are apt to contract the disease; hence nurses and physicians are in special danger. "In the Crimean war—1854-56—during the height of the epidemic, in a single period of fifty-seven days, typhus fever attacked six hundred and three nurses in a total of eight hundred and forty in the service; and in the Russo-Turkish war, 60 per cent of the physicians were attacked." Those who handle the soiled linen are peculiarly liable to the infection, as the linen retains the poison for a long period.

Pathology.—There are no characteristic lesions of the viscera. The blood is dark and diffuent, the result of the intense fever and rapid work of the poison. The liver is somewhat enlarged and softened, as are the kidneys and spleen, and each becomes dark-red in color. There is generally a bronchial catarrh, and many times hypostatic congestion of the lungs.

Extravasation into the pericardium gives it an ecchymotic appearance, which is also seen in the gastro-intestinal mucosa. The intestinal lesion is not characteristic as in typhoid fever, and while there may be hyperplasia of the lymph follicles, there is never ulceration as in the former. Peyer's plaques are also intact, although congested.

There is often granular engorgement, but the process stops short of suppuration. The muscular tissues are of a dark-red

color and the heart often shows granular degeneration, and is of the same dark-red color. There may be cerebral congestion, with effusion into the subarachnoid space and the ventricles. The coagulability of the blood is greatly diminished. The skin shows a characteristic rash, and ecchymotic spots are found on the more dependent parts after death.

Symptoms.—The period of incubation, the time from exposure to invasion, varies from three to twelve days, according to the intensity of the infectious material and the susceptibility of the patient. Although the onset is usually sudden, we may have during the last three or four days prior to the invasion the usual prodromal symptoms that accompany most fevers; viz., headache, languor, loss of appetite, aching of back and limbs, insomnia, and partial arrest of the secretions. These increase progressively until the chilly sensations or a rigor proclaim the invasion.

Invasion.—The chilly sensations continue for several hours or a sharp, short chill may announce the unwelcome guest. The patient complains of severe pain in his head, and the muscles seem sore as if bruised. There is now great prostration, and the patient is compelled to take to his bed. The temperature rises very rapidly, and by the end of twenty-four or forty-eight hours the temperature may register 104° or 105°. The pulse is rapid, full, and bounding, with throbbing of the carotids, although after the first forty-eight hours the pulse loses its strong impulse and becomes small and feeble, showing the influence of the toxin on the heart.

The face is characteristic. There is a dusky flush, with injected and contracted pupils. The skin is dry and pungent; the tongue is at first but slightly coated, but soon acquires a thick, dry, and brown coating. There is often nausea and vomiting during the first forty-eight hours. The pain in the head becomes intense, and the symptoms of meningitis are often present. The mind is early impressed, and delirium may occur as early as the second day, varying greatly in character, from the mild to the most intense. Usually, however, the patient becomes dull, and is impressed with difficulty, and stupor is an early feature.

Eruption.—From the third to the fifth day the eruption makes its appearance, at first on the abdomen, gradually encroaching upon the other parts of the body, although singularly sparing the face in most cases. The rash is characteristic, first appearing as

bright red macules, disappearing on pressure, and soon changing to a dark, dingy red, becoming hemorrhagic in character, and petechia follows, the rash remaining after death.

There is no abatement of the fever with the appearance of the rash. By the end of the first week the fever is intense and uniform. Temperature 104° , 105° , or 106° . The tongue is dry and almost immobile; sordes appear on teeth and lips; the skin is hot, dry, and constricted; the urine is scanty and contains albumen. With the appearance of the eruption there is often retention of the urine. The patient lies upon his back, and tends to slip towards the foot of the bed. Although there is stupor, the eye may be open and the patient muttering; or the delirium may be very active. From the seventh to the fourteenth day the symptoms are quite uniform, showing great depression and much deprivation of the blood. There is increased suppression of muscular power, and an increase of involuntary action, as tremors, subsultus tendinum, and slight convulsive action.

The symptoms of the crisis have been thus described: "At the end of the thirteenth day a more serious exacerbation than any former one takes place; the heat is more glowing, the arteries pulsate more strongly, the brain is more affected, and the stupor passes into sopor. In twelve hours afterward, and on the fourteenth day, the parched skin shows a tendency to perspiration. In some cases slight epistaxis occurs, with relief to the head; the nostrils become moist; the tongue, at the point and edge, moist, clean, and red, and perspiration more copious and general.

"A free expectoration often takes place, especially if the chest has been affected. When the perspiration is salutary, it is uniform, not clammy, has a peculiar odor, and occurs during sleep. The stools are now copious, loose, and offensive; the urine plentiful, muddy, and slightly colored, and deposits a copious sediment. With these changes, or within a few hours afterward, the patient seems as if awakened from a dream, or from a state of intoxication, and, with the return of complete consciousness, all the severe symptoms abate." Convalescence is usually quite rapid and uneventful.

Complications.—The most frequent, and quite common complication, is bronchitis, which occurs from the third to the seventh day. There is a sense of constriction of the chest, hurried respiration, dry, hard, and harassing cough, with an aggravation of all

the symptoms. There may be hypostatic congestion of the lungs, rendering the respiration more labored; the duskiess of face increases, showing imperfect aeration of the blood. Thus more work is thrown on the heart, which greatly endangers the patient's recovery.

Temperature.—As will be seen by studying the chart, the range of temperature in typhus fever is higher than in any other fever, frequently running for ten days at 105 or more. In the milder cases the high range does not occur, and after the seventh day there is a more rapid decline, convalescence commencing the eighth or tenth day.

Diagnosis.—The diagnosis is readily made. The known presence of an epidemic, the sudden invasion beginning with a rigor, the high grade of fever, the more intense disturbance of the nervous system, the dusky flush of the face, the characteristic petechial eruption occurring the third day, render the diagnosis comparatively easy. We diagnose it from typhoid by the long forming stage of the latter, the less intense febrile reaction, and also less disturbance of the nervous system, the absence of the intestinal lesion, the difference in character of the eruption, and also the time of its appearance.

In sporadic cases, if not careful, we may mistake it for spinal-meningitis, although in the latter the head symptoms are more pronounced, with retraction of the head, marked tenderness on pressure over the cervical region, and an absence, on the third day, of the petechial rash.

Prognosis.—The prognosis depends upon several conditions,—the severity of the epidemic prevailing; the character of the complications; the vitality of the patient, the mortality being great where this is reduced; the age of the patient, but few children dying, while, after middle life, the mortality increases; the intensity of the lesion of the nervous system, and the severity of the blood lesion.

Race is also to be considered, the colored race succumb more rapidly than the white race. The mortality is given at from ten to thirty-five per cent, but with the sanitation now in vogue, and the use of remedies with which we have been successful in overcoming sthenic fevers, and the septic conditions, the mortality should not be large.

TYPHUS FEVER.

Plate 4.

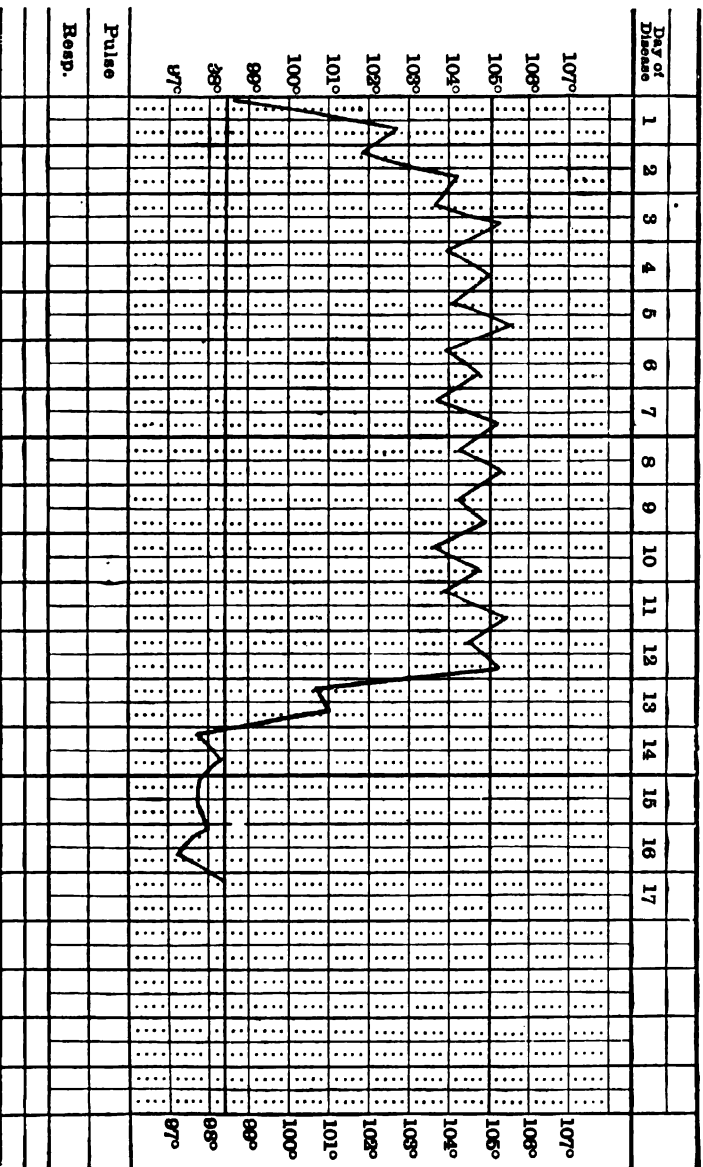


Chart of typhus fever (Pepper). (Lockwood.)

Treatment.—The prophylactic treatment should consist of disinfection, immediate isolation, and a persistent effort at cleanliness. There should be plenty of pure, fresh air in the sick-room.

In the treatment of this disease there are three conditions to overcome,—sepsis, high temperature, and wrongs of the nervous system; the two latter, no doubt, being due to the first, sepsis.

The room, where possible, should be large, well ventilated, and the temperature, if in winter, not allowed over 68 degrees.

Veratrum.—Where there is a full, bounding pulse and throbbing of the carotids, veratrum, drachms ss to drachms i, to water iv ounces, will be the indicated remedy. In connection with this, the wet-sheet pack may be used, if temperature be very high, 104° or 105°. Where the poison is intense, the extremities are cold, the patient is dull and drowsy, and the pulse feeble and oppressed, blankets wrung out of hot mustard-water, and placed about the patient, with a stimulating emetic of capsicum and lobelia, will give good results.

Belladonna will be called for where there is dullness and coma.

Gelsemium will be the remedy where there is great irritation and active delirium.

Hyoscyamus will also be used where the patient is restless and unable to sleep.

Echinacea.—This remedy should give a good account of itself in typhus fever. The furred tongue, the dusky hue, calls for the agent. *Echinacea*, drachms i to water iv ounces, teaspoonful every hour. It should be continued with the proper sedative.

Baptisia.—The full tissues with purplish hue, as if the patient had been frozen, calls for baptisia.

Sodium Sulphite.—Where the tongue is broad, moist, and heavily coated with a dirty, pasty coating, a saturated solution of sodium sulphite, in tablespoonful doses, will not disappoint.

Potassium Chlorate is the remedy for bad odors, and where the tongue is moist, dirty, and the breath foul, potassium chlorate will be the remedy.

Hydrochloric Acid.—Where the tongue is dry, brown, or red, sordes on teeth and lips, nothing can take the place of hydrochloric acid, C. P., gtts. xx, simple syrup and water aa ʒiii. Teaspoonful every two hours. This is one of the most severe forms of

fever; but, with good nursing, the proper antiseptics, the proper wet-sheet packs, and the use of belladonna, gelsemium, and hyoscyamus for the nervous lesions, many will recover.

RELAPSING FEVER.

Synonyms.—Typhus Recurrens; Bilious Typhoid; Famine Fever; Hunger Pest; Spirillum Fever.

Definition.—An acute, infectious, and contagious fever, characterized by a series of exacerbations and remissions, each lasting from five to seven days, and prevailing epidemically.

History.—There is but little doubt that this fever prevailed previous to 1739. Some indeed believe that it existed during the time of Hippocrates, and cite, as evidence, his description of an epidemic which prevailed during his time. The first authentic account, however, dates from the epidemic which prevailed in Ireland, Scotland, and England in 1839, since which time it has gradually extended to other parts of the world, few countries escaping, notably Spain, Switzerland, Italy, and in France only a few sporadic cases.

It made its appearance in the United States in 1844 at Philadelphia, being brought by Irish immigrants. In 1847 it appeared in New York and Buffalo. In 1869-70 it again appeared in Philadelphia, and in the same way; viz., through Irish immigrants. In 1872-73 it made its last visit to our shores, New York being the place of its visitation.

Etiology.—The predisposing causes are similar to those of typhus fever; viz., filth, poverty, and overcrowding. This combination of conditions is prolific in furnishing a soil which readily generates toxins of an intense character, and occurs among a class whose vitality is lowered by insufficient and defective food.

Age and Sex.—Age has but slight bearing upon the etiology, although the greater number of victims are between the age of fifteen and thirty.

Race.—Race also plays but a very little part, save that some are more uncleanly than others, the negro being slightly more susceptible than other races. Neither season nor climate figures in the spread of the disease.

Famine.—During the time when scarcity of food prevails, the impoverished are peculiarly susceptible, and no doubt this bears upon its etiology.

Exciting Cause.—In 1873, Obermeier discovered in the blood of patients suffering from this fever a characteristic spirillum, which has been termed the "Spirillum Obermeier." Since then the same micro-organism has been found by many observers, and this specific germ is now generally recognized as the causal factor in producing the disease. It is found in large numbers during an exacerbation, but disappears during the period of intermission, small granular bodies being seen at this time, supposed to be the spores of the spirillum.

Pathology.—There are no characteristic changes in the solids of the body. The voluntary muscles are inclined to undergo granular degeneration, and where there is icteric discoloration during the disease the tissues are stained after death. The liver, kidneys, and spleen are somewhat enlarged, especially the latter organ, and hemorrhagic infarcts are not uncommon. The kidneys and spleen present a mottled appearance, with extravasation of blood beneath the surface. The heart, in severe and prolonged cases, becomes soft, and granular changes take place. Pleurisy and pneumonia are often present, although not a constant feature. The body retains its heat a long time after death, and the blood coagulates slowly, if at all.

Symptoms.—The period of incubation is from five to seven days, although it may be much shorter where the system is impoverished and the infection is intense. The onset is usually sudden, although there may be the usual prodromal symptoms for twenty-four or forty-eight hours preceding the invasion, which is usually announced in the early part of the day by a severe rigor, although there may be only chilly sensations.

This is rapidly followed by reaction, extreme in character, the temperature often rising to 104° , 105° , or 106° at the end of the first twenty-four hours. The pulse is very rapid, from one hundred and twenty to one hundred and fifty per minute. The prostration is great, and the patient is compelled to take to his bed. The face is flushed, the eyes contracted, the skin hot, dry, and pungent, although frequently profuse sweating occurs. There is nausea and sometimes severe vomiting. The pain in the head

is intense, with more or less vertigo. Myalgia is a marked feature, and the patient complains of pain in back and limbs; in fact, of aching all over.

By the second or third day a characteristic icteric discoloration makes its appearance, although this is not constant. Although the fever is intense, there is rarely delirium, the patient retaining his mental faculties throughout the disease. Owing to his sufferings he is restless and secures but little sleep.

From the third to the sixth day the fever is intense. There is tension and pain in both hypochondriac regions, due to swelling of the liver and spleen. The tongue is at first moist, but becomes dry and brown. The constipation may give way to diarrhea. Preceding the crisis, there may be an aggravation of all the symptoms, when suddenly the temperature begins to fall, the skin becomes moist, the urine is more copious, and by the end of ten or twelve hours the patient is free from pain and the temperature is normal. Convalescence is rapid, and often by the end of the second day he considers himself well.

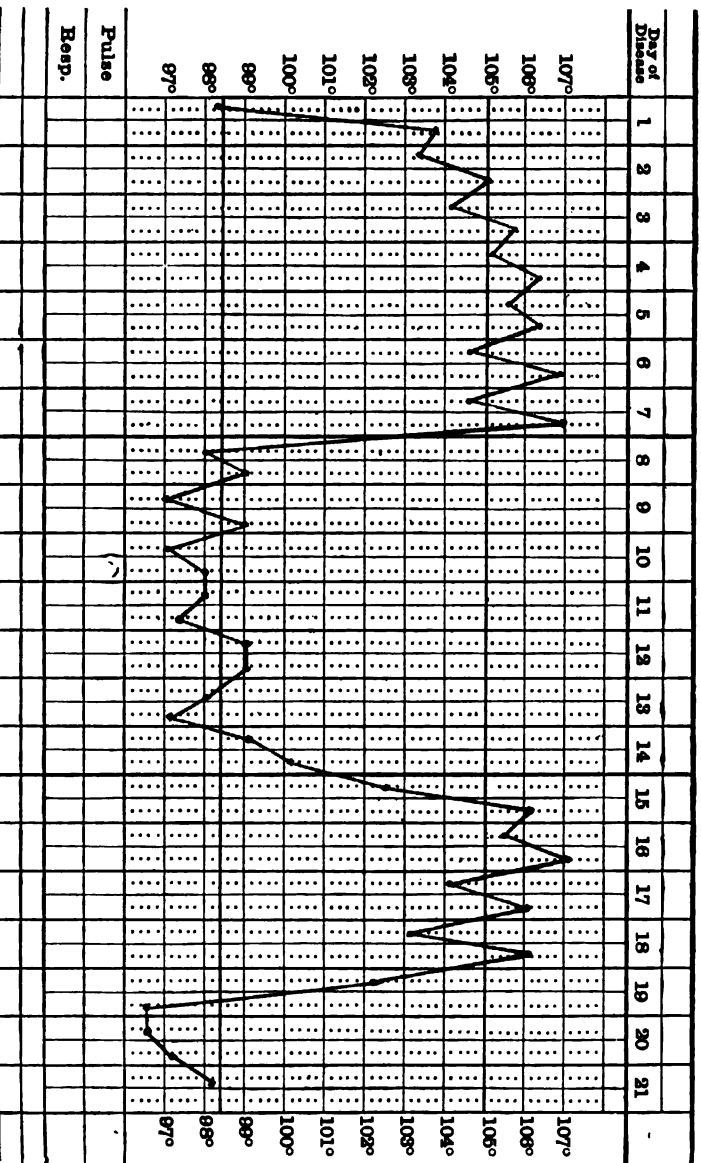
The period of comparative health lasts from five to seven days, when a chill ushers in another exacerbation; the headache, myalgia, high temperature, and all the other symptoms of the exacerbation are repeated. It is usually, however, of shorter duration, the crisis occurring the fourth, fifth, or sixth day, to be followed by convalescence, although there may be a second, third, or even fourth exacerbation. Where there are two or more, each becomes shorter in duration.

The most frequent complications are lobar and bronchial pneumonia, more rarely acute nephritis.

Diagnosis.—The course of the disease is so characteristic that, where an epidemic has been established, the diagnosis is comparatively easy. The rapid rise in temperature, the intense headache and myalgia, great excitation of the nervous system without delirium, would suggest relapsing fever. We would recognize it from typhus fever by the absence of delirium, the characteristic rash, and by the early crisis; from typhoid fever, by the long forming stage of the latter, the dull intellect, and the intestinal lesion; from cerebro-spinal fever, by a higher and more irregular temperature range, no tenderness along the cervical region, and but slight drawing of the head backwards.

RELAPSING FEVER.

Plate 5.



Typical case of relapsing fever (Pepper.) (Lockwood.)

Prognosis.—The prognosis is usually favorable, the mortality being from three to six per cent. The result depends largely upon the complications and the age of the patient. Where pneumonia and acute nephritis occur, the prognosis must be guarded, as it must also be when it occurs in elderly people.

Treatment.—Although, as a school, we have not had the opportunity of testing Eclectic remedies, owing to the few epidemics which have prevailed, the general management would be similar to that for typhus fever. We would think of isolation, perfect cleanliness, and plenty of fresh air. The use of baths, probably sponging with hot water, to determine the heat to the surface, and constant fanning of the face of the patient by an assistant. This rapidly cools the surface and lowers the temperature.

Echinacea, baptisia, the sulphites, chlorates, and mineral acids as might be indicated by the tongue, for sepsis. Macrotys, gelsemium, rhamnus Californica, and the old diaphoretic powder would be suggested for the myalgia, while stimulants would be used where the temperature became sub-normal or the heart became weak. For the congestion of the liver and spleen chiaonanthus and polymnia would be the agents of probable value. Should respiratory complications arise, such as pneumonia, pleurisy, or bronchitis, the treatment so successfully employed by our school for these diseases would be used; in fact, whatever complication should arise, the intelligent physician would meet the conditions by appropriate remedies.

The diet will consist of broths and milk in some form till the temperature becomes normal.

MALARIAL FEVER.

Synonyms.—Ague; Chills and Fever; Intermittent Fever; Swamp Fever; Marsh Fever; Paludal Fever.

Definition.—A specific, infectious, although non-contagious fever, caused by the hematozoa of Laveran, and consisting of two distinct parts: First, a succession of exacerbations and intermissions, or a series of short fevers separated by short intervals of health; second, a continued fever made up of exacerbations and remissions, there being but one cold stage. The disease is characterized by congestion of the spleen and portal circulation.

History.—Although Rome, secure on her seven hills, had conquered and ruled the world, there was one insidious foe whom she could not overcome. Intrenched in the Pontine Marshes there lurked an enemy that overcame her bravest sons and fairest daughters, and this same formidable foe has been found endemically and occasionally epidemically, from time immemorial, in nearly every clime save the extremes of latitude. During the last fifty years it has been progressively decreasing, and sections where once the disease prevailed in force are now almost immune.

It is more prevalent in the tropics, and diminishes as we recede from them. In Europe, Russia and Italy are the chief points of infection, while Germany, France, and England are rarely visited by the disease. It is also severe in Africa and India. In the United States it prevails largely in the South, while the East, North, and West are but slightly affected. Even in the South, however, there is a marked decrease in the number of cases during the last twenty years.

Etiology.—*Soil.*—The condition of the soil has been recognized as a causal factor for a great many years by a majority of the profession. A humid soil, producing a luxurious vegetation, was long regarded as a habitat for malaria; and marsh miasm, arising from the decomposition of vegetable matter, was long credited as the principal factor in giving rise to this class of fevers.

That low, marshy, and swampy lands are the great breeding places of malaria has also been recognized from time immemorial. The Pontine Marshes about Rome, a veritable hotbed for the disease, is one of many examples. Fresh-water marshes, situated near the sea, when slightly influenced by salt water, are especially favorable for the generation and multiplication of the parasite or poison.

The specific cause, then, may be said to reside in the soil made rich by the decomposition of vegetable matter, or upon its surface. The exposing of virgin soil, either in the overturning for agricultural purposes, or in digging trenches, or in excavations, has exposed the germs, and epidemics have followed where before the disease was unknown. In contrast to this, malaria has been found to exist in dry, sandy soil, although, in all probability, the poison had been carried by prevailing winds, rather than that such soils are the natural habitat of the disease germs.

Heat.—A temperature of sixty-five degrees is necessary for the development of the hematozoa, and consequently we find the disease prevailing to a far greater extent in the tropics than in the temperate zone. In fact, as we recede from the tropics, there is a progressive decrease in malaria.

Moisture.—A certain amount of moisture seems necessary for the development of the poison, although the large number of cases following a hot, dry summer, seemingly contradicts this statement.

In the tropics the disease prevails to a far greater extent during the rainy season, and the disappearance of malaria by draining marshy sections confirms this view.

Winds.—That the poison may be transferred some distance by strong winds has been clearly proven by sailors contracting the disease while anchored three to five miles off malarial shores; on the other hand, these same winds, by rapidly drying the soil, may combat its influence.

Trees.—The Eucalyptus-tree at one time was supposed to possess some virtue in combating the toxin, and the marked decrease in large areas where these trees were planted, notably in the Roman Campagna, were cited as proof; but the more rational view is that by drawing large quantities of water from the soil, it was thus rendered sterile to the germ, and that any rapid-growing trees would give like results.

Altitude.—That gravity influenced the poison was very early recognized by people settling in malarial sections, for it was soon learned that by building their houses on high lands they rendered themselves comparatively free from the disease, and that those residing in the second stories of buildings were also largely exempt, while those on the ground floor suffered. The poison is found near the ground, save when carried to higher altitudes by high winds.

Season.—Heat being an important factor in the development of the poison or germ, we find the disease prevailing more extensively in the fall, following the hot weather of July and August, the maximum number of cases occurring in September. While this is true of the temperate and sub-tropical zones, in the tropics as many cases occur in the spring as in the fall.

The Malarial Germ or Parasite.—In 1879, Klebs and Tomassi Crudeli discovered that certain soils, when the conditions of moisture and heat were favorable, resulted in the development of

malaria, and they succeeded in isolating a specific germ, which they termed the bacillus malaria, and claimed that it was the specific agent causing all forms of malaria. Other observers, however, after most careful and painstaking study, failed to confirm the claims of these two workers, and it remained for a French army surgeon, Lavarán, in the following year, 1880, to discover in the blood of malarial patients the specific parasite that is now recognized by the medical world as the causal agent in all forms of malaria.

For three years his discoveries and publications caused but little interest in the medical world, but Richard, in 1882, and Marchiafava, Golgi, and Celli in 1883, Italian observers, published their investigations, ratifying the observations of Lavarán. Since then Concilman, Osler, James, Dock, and others of the United States; Van Dyke Carter, of India, as well as French, German, English, and Russian observers, all unite in their declaration that Lavarán's observations were correct, and that the parasite described by him is the specific cause of malaria.

Parasites.—These micro-organisms belong to the hematozoa, a sub-class of the protozoa. Three varieties have been carefully studied, each of which gives rise to a certain kind of malaria. These three are the Tertian, Quartan, and Estivo-Autumnal, other types being simply a development of two or more of these groups at different intervals. These parasites enter the blood corpuscles as minute hyaline bodies, possessing ameboid movement. Having gained entrance into a corpuscle, the further development is at the expense of its contents, converting the hemoglobin into pigment granules, which collect near the center of the parasite. On reaching maturity, segmentation or sporulation takes place, and the membrane or wall of the corpuscles gives way, liberating a fresh generation of hematozoa. They consist of very minute, spherical hyaline bodies, and those escaping the phagocytes enter other corpuscles, and there the process is repeated over and over again.

While the tertian and quartan parasites are thus developed, Golgi's investigations go to prove that the evolution of the estivo-autumnal germs takes place in the spleen, liver, and bone marrow. The evolution of each of these parasites is somewhat different.

Tertian.—The life cycle of this variety is forty-eight hours, sporulation taking place, accompanied by a paroxysm every third

day. The parasite is first seen in the corpuscle as a minute hyaline, ameboid body. It develops at the expense of the red corpuscle, converting the hemoglobin into pigment granules, which range themselves in the center of the parasite. During this process, the blood corpuscles become pale and somewhat increased in size. When completely developed, segmentation or sporulation occurs, and from fifteen to twenty new bodies are formed. At this stage the paroxysm of the fever occurs.

Quartan.—The life cycle of this parasite, or its period of development, is seventy-two hours, the paroxysms occurring every fourth day. When first seen in the blood corpuscles, it is a simple hyaline body resembling the tertian type, although of less size (about one-half the size of the red corpuscle), slower in its development, and occupying more time for its complete evolution.

The pigment granules, dark-brown in color, are coarser than those of the tertian; as they develop, the corpuscle shrinks about the parasite and assumes a brassy color. Having reached its maturity, sporulation or segmentation takes place, and from six to twelve germs are liberated with the rupture of the corpuscular membrane. About this time the paroxysm of the fever takes place.

Estivo-Autumnal.—This is the most irregular of the malarial parasites. At first it resembles those of the tertian and quartan; viz., small, spherical, hyaline, ameboid bodies that require from twenty-four to forty-eight hours for their full development. They have a peculiar and distinct faculty of producing crescent-shaped bodies from the round parasites; these are not seen till after the fever has progressed for several days. The young parasites are seen in the peripheral circulation in their early stages, their further development and segmentation taking place in the spleen, liver, and bone-marrow.

If blood from the spleen be examined, they will be seen in different stages of their evolution. This parasite is much smaller than either of the other forms already considered, has fewer pigment granules, and in sporulation throws off fewer offspring. The blood corpuscle shrinks about the parasite, becoming brassy in color. The irregularity of their development accounts for the different phases of autumnal fever.

Each variety of parasites may develop flagella, which may become separated and float off among the corpuscles. Their exact nature has not yet been determined. From these three forms the

different forms of malarial fever are developed,—the quotidian form, from two groups of the tertian, developed on successive days; and this combination of two or more varieties, or two or more groups of the same variety, explains the popular types occasionally seen. (See table of types.)

Method of Infection.—There are three theories of the manner in which the parasites enter the system: 1. The Water theory; 2. The Air theory; 3. The Inoculation theory.

Water Theory.—A great many examples are cited by Lavarán, Sternberg, and other observers, to prove that infection may take place through drinking water. Three principal experiments will suffice in support of this theory. First, in special malarial sections, where the inhabitants were using water from stagnant pools and suffering from malaria, the disease was made to disappear by furnishing a pure water-supply. Second, malaria introduced into healthy places by using drinking water brought from malarial sections. Third, examples were given where travelers who were passing through malarial countries, preserved their health by using only boiled water, while those of the party who did not take this precaution were attacked in large numbers. While many of the experiments to prove the water theory are plausible, they are not above criticism from a scientific standpoint.

Air Theory.—The air theory has fewer apparently conclusive evidences whereby the disease has been contracted from this source than the water theory, and while sailors have contracted malaria while lying at anchor off shore, while the prevailing winds were directly from the malarial districts, yet it is a well-known fact that the sea-breeze which blows in Rome during the summer months does not bring danger, although it passes over all the numerous foci of malaria in the western half of the Campagna and over all the swamps on the coast. Tomassi Crudeli has proved that the malarial germs rise but a short distance from the ground, and hence are not apt to be carried very far by the prevailing winds.

Inoculation Theory.—This theory, that the germs are inoculated into man through the mosquito, is the only one which has, to date, been demonstrated experimentally.

Bignami, who belongs to the Italian school, after much research, came to the conclusion that malaria acted like a disease inoculated through the sting of a mosquito. To prove the truth

of his theory experimentally, he caused perfectly healthy men living in a positively non-malarial section to be bitten by mosquitoes transported from a place where malaria prevailed. These experiments were made with great scientific care, and gave positive results. Through the courtesy of William Wood and Co., publishers of the "Twentieth Century Practice of Medicine," I quote Bignami's description of his experiments:

"Experiment No. 1.—Sola slept in the room (in which the infected mosquitoes had been liberated) from September 26th to the end of October, 1898. During the latter part of October the patient complained of malaise and headache. On the afternoon of October 31st he had a slight elevation of temperature to 37.2°C. (99°F.) On November 1st, at about three P. M., he was taken with a severe chill, which lasted until five o'clock, the temperature rising rapidly to above 39°C. (102.2°F.) Between nine and ten o'clock a feeling of cold was again experienced. The fever continued all night, falling in the early morning (November 2d) to 38.2°C. (100.8°F.), and rising again that evening to 39.3°C. (102.7°F.) The patient was restless, and complained of very severe headache, but there were no grave symptoms. In the night, about eleven o'clock, he had another chill of short duration. During this night the temperature remained above 39°C. (102.2°F.), and on the morning of November 3d rose above 40.4°C. (104.7°F.), the patient being very restless and complaining of much suffering. The fever broke in the afternoon with a gentle perspiration.

"At a quarter after five in the afternoon a hypodermic injection of 1 gm. (gr. xv) of quinine was given, and repeated in the night. The fever fell, and at eight A. M., on November 4th, the temperature was 36.7°C. (98°F.) The administration of quinine was continued during the following days; the patient continued to have slight elevations of temperature which did not reach 38°C. (100.4°F.), except once on November 6th. From November 7th onward, the patient was entirely without fever, and rapidly regained his appetite and strength.

"An examination of the blood, made with the greatest care on November 2d, gave negative results, no malarial parasites being found. On the morning of November 3d a few young annular parasites, motile and discoid, without pigment and presenting the characteristic appearance of parasites of estival fever, were found.

These forms increased in numbers during the day, and were quite numerous during the afternoon hours. In some there was a beginning pigmentation at the border, consisting of very fine granules of pigment. Before the quinine was given, dried preparations were made, which were then fixed in absolute alcohol and strained with hematoxylin and eosin, after Romanowsky's method. In these preparations the parasites appeared in the characteristic annular form, with chromatin stained in the typical manner.

"We see, therefore, that there was produced experimentally in Sola a grave malarial fever with a temperature curve such as is frequently seen in a primary estivo-autumnal fever infection. The fever began briskly, continued with slight remissions from November 1st to 3d, and began to fall on the evening of the latter day, when the specific remedy was administered. The parasites found in the blood belonged to the estivo-autumnal species. Taking into account these findings and the course of the fever, we believe that the continued curve of the latter, had it not been for the therapeutic intervention, would have become transformed into that of an estivo-tertian fever.

"This is perhaps the first time that, in the primary estival infection acquired in the natural way, examinations of the blood have been made from the beginning of the fever. We find that, after about forty hours, the parasites begin to be found, at first in small numbers, but rapidly becoming more and more numerous. According to the opinion of all who followed this experiment, it was conducted in such a way as to silence all objections. Sola is a robust individual, notwithstanding his nervous malady, who has never in his life had a malarial fever, and who has not been outside of the Santo Spirito Hospital for six years. The room where the experiment was conducted was an annex of the San Carlo ward, in which, within the memory of the hospital physicians, there has never been an autochthonous case of malarial fever, nor has there ever been any malaria in the neighboring houses. . . . We are then forced to the conclusion that this fever was acquired by inoculation by the mosquitoes."

"Experiment No. 2.—N. N——, a robust young man, who has never had malarial fever, but is under treatment at the Santo Spirito Hospital for nervous trouble, consented to sleep in the mosquito room on the nights of November 13th and 14th. The day before about one hundred individuals of *A. claviger* caught

at Maccarese were liberated in this room. The subject of the experiment continued to sleep regularly in the room up to December 2d; he entered it at dusk and left it in the morning, passing the day in the general ward. He asserts that he was bitten by the mosquitoes every night, and there were always found in the room numbers of *A. claviger* full of blood. Some of the insects died during this time, but on November 29th there were still found about fifty in good condition.

"The first two days of December the patient was indisposed and had a slight elevation of temperature. On December 3d he had a febrile attack, which began with a chill, the temperature rising to a maximum of 39.7°C. (103.5°F.) Similar attacks, each preceded by a chill, were observed on the following days up to December 7th, when 2 gm. (gr. xxx) of quinine were administered. On December 8th and 9th slight elevations of temperature were observed, but after that none. The patient continued to take quinine for a time, and rapidly recovered. The following are the temperature observations in degrees Centigrade from December 3d to 7th:

"December 3d.—4 P. M., 39.8°; 6, 39.7°; 8, 39.7°; 10, 37.5°; 12, 37.7°.

"December 4th.—Apyrexia up to 6 A. M.; 8, 37.6°; 10, 38°; 12, 38.9°; 2 P. M., 40.2°; 4, 39.5°; 6, 37.5°; 8, 37.6°; 10, 37.7°; 12, 37.8°.

"December 5th.—Apyrexia up to 10 A. M.; 12, 39.5°; 2 P. M., 39.9°; 4, 40.5°; 6, 39.1°; 8, 38.5°; 10, 37.5°.

"December 6th.—Apyrexia from the last entry up to 8 A. M.; 10, 39.3°; 12, 40.5°; 2 P. M., 37.8°; 4, 38.7°; 6, 38°; 8, 37.1°.

"December 7th.—Apyrexia from last entry up to 10 A. M.; 12, 38.7°; 2 P. M., 38.1°; 4, 38.3°; 6, 37.5°; 8, 37.3°.

"The course of the fever was that of a double tertian. From the first febrile paroxysm, tertian parasites were found in the blood, which followed regularly the development in two generations corresponding to the daily attacks of the fever. A fact worthy of consideration is, that from December 6th—that is to say, four days, or, at the most, five, after the beginning of the disease—the patient had in his blood adult parasitic forms capable of further development in the body *Anopheles*. And, in fact, many individuals of *A. claviger*, which had been bitten about

eleven o'clock on the morning of this day, were found later to have the middle intestine infested with tertian parasites."

"Experiment No. 4.—A patient suffering from a relapsing estivo-autumnal infection, in whose blood were many crescents and round and flagellated bodies, slept from December 10th to 18th in a room in which had been set free about fifty individuals of *A. claviger* brought from Maccarese. The temperature of the room was maintained at from 18° to 22°C. (64.4° to 71.6°F.) Most of the mosquitoes stung the patient and became infected with crescent bodies, and subsequent examination showed in the middle intestine the characteristic forms in process of development. But it was also observed that the mosquitoes remaining in the room at the given temperature during the last days of December did not have in the intestine mature sporozoa with sporozoites, but only growing forms. Evidently at a temperature of from 18° to 22°C. the life cycle of the parasite is completed very slowly. But these same mosquitoes, confined for a few days in an incubator at a temperature of 30°C. (86°F.), were found to contain forms of a later development. There were noted, indeed, in the intestine, typical capsules filled with sporozoites, and also broken and empty capsules, and in the salivary glands were numerous sporozoites.

"When this fact was noted, three mosquitoes of this group were kept in the incubator at 30°C. for two days, and on January 2d they were made to sting a new subject, A. B——, who lent himself knowingly and willingly to the experiment. It is needless to say that this man had never had malarial fever. On January 5th, two of the same mosquitoes were made to sting the same person again, who then had been stung in all five times by three specimens of *A. claviger*.

"After this part of the experiment, the three mosquitoes were dissected and examined under the microscope, with the following result:

"*A. claviger*, No. 1.—In the intestine were found very many capsules, with sporozoites, and some capsules which had been ruptured and completely emptied of their contents. In the salivary glands were found two infected tubules; in one were seen the cells swollen, of ovoid form, and filled with granules of uniform size. When pressure was made on the preparation, there issued a very large number of sporozoites of typical form, uni-

form in appearance, and all of equal length; in the other tubule were also seen cells containing filiform sporozoites of characteristic appearance.

"A. claviger, No. 2.—In the intestine were found very numerous capsules, some still whole and filled with sporozoites; others ruptured and shrunken, containing a granular residuum of a pale yellow color. In some of these ruptured capsules were seen also brown bodies of variable size and shape, some elongated, others short and deformed. In the salivary glands all the tubules were infected except one or two. In them were seen cells containing typical sporozoites, cells filled with granules similar to those described in the case of A. claviger No. 1, and cells filled with round hyaline bodies of variable size. In addition there were also found typical filiform sporozoites along the excretory duct of the gland.

"A. claviger No. 3.—The intestine was filled with mature sporozoa. Many capsules were broken and shrunken, and contained a pale yellow detritus; others contained a large central body of granular aspect, surrounded by a hyaline halo, and without any recognizable structure. These were possibly mature sporozoa in process of degeneration. The salivary glands were not found infected. From the results of this examination we may conclude that of the three specimens of A. claviger employed, only two had inoculated the patient with malaria.

"On the evening of January 10th the patient had a sense of heat and headache, but the temperature was normal. On January 11th, 12th, and 13th there was no fever, and the patient felt well. On January 14th—that is, after from nine to twelve days of incubation—there was no fever until eight o'clock in the morning, but then the temperature began to rise rapidly and reached 39.5°C. (103.1°F.), at noon. From this time the fever remained continuous up to January 18th. On January 14th, the temperature fluctuated from 39.5° at noon to 37.5° at 4 P. M. At midnight it was 38.9°; at 2 A. M. on the 15th, 39.5°; at 10 A. M. 37.5°, and at noone 40.4°. On the 16th it varied from 37.2° at 6 A. M. to 40.4° at 4 P. M. The extremes on the 17th were 38.2° at 4 A. M. and 40.4° at 4 P. M. The temperature fell to normal at 6 A. M. on the 18th.

"On January 16th a hypodermic injection of hydrochlorate of quinine 2 gm. (gr. xxx) was administered, and this was re-

peated on the following day. The patient was entirely without fever on January 18th, but he continued to take quinine, and, except for very slight elevations of temperature on the evenings of January 19th and 22d, he had no further trouble. Recovery was perfect and rapid.

"On examination of the blood on the morning of January 15th, there were found scanty estivo-autumnal parasites, with very fine pigment granules at the periphery. On January 16th there were found also plasmodia without pigment and with granules in normal red-blood corpuscles and in brassy bodies. The parasites disappeared after the exhibition of quinine on January 17th. Thus the infection was rapidly cut short, and no crescent bodies were seen.

"We have in this case a typical example of estivo-autumnal infection beginning with a continued fever, as is usual in this group of malarial affections. The course of the disease was in every respect identical with that in the first case of malarial fever, experimentally induced by the stings of mosquitoes (the Sola case), described by Bignami."

Thus the life cycle of the malarial parasite in mosquitoes has been proven to be similar to the life cycle of the parasite in man, and that mosquitoes may take the parasite from man and inoculate man with it again. The mosquito responsible for this kind of work is the *Anopheles clavinger*, which may be distinguished from the harmless variety by taking the vertical position while at rest, while the others, the *Anopheles culex*, are parallel to the surface while at rest. (See cut of Mosquito.)

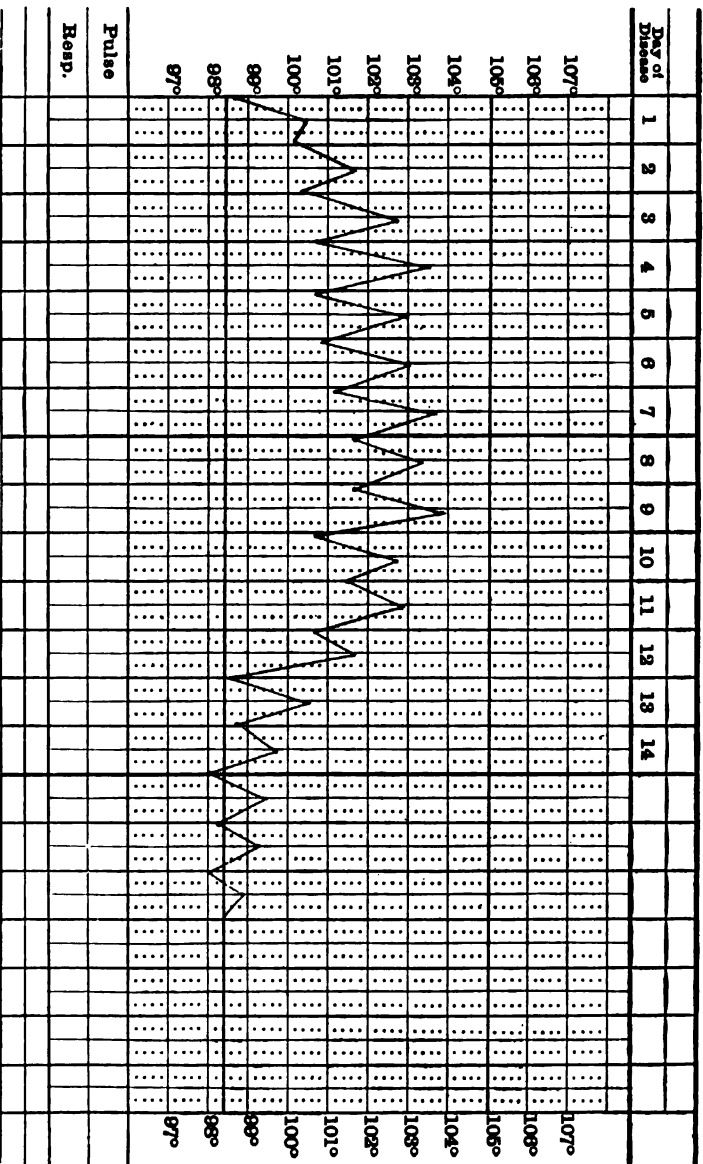
Pathology.—The morbid changes that are found in malaria are due to the disintegration of the red-blood corpuscles. The destruction of the corpuscles—and they are found in all stages of dissolution—may be due to the action of the parasite, or a toxin resulting from the bacilli or from metabolic changes of which we are still ignorant.

The anemia that attends malaria is thus explained in the rapid destruction of the red-blood disks. The increase of pigment, melanin, in the spleen, liver, kidneys, blood-marrow, and, in fact, in all the viscera, is due to the conversion of the hemoglobin into pigment granules.

The spleen is enlarged, of a dark slate-color, and more or less friable. In the more severe or chronic forms it becomes enor-

MALARIAL FEVER.

Plate 6.



Temperature chart of remittent fever (Lockwood.)

mously enlarged, and is known as ague cake. The liver partakes of the same changes, although the enlargement is not so great. It is of a dark color, and contains pigment granules. The kidneys are somewhat enlarged, are of a dark-red color, and have the characteristic pigment. Pigment granules are also sometimes found in the white corpuscles. Parasites are found in the phagocytes, and occasionally pigment granules. The leukocytes are not increased.

Division.—Etiologically, malaria is divided into Tertian, Quartan, and Estivo-Autumnal; clinically, into Intermittent and Remittent.

The chief characteristic of an intermittent fever is the distinct and periodic or rhythmic recurrence of its exacerbations and intermissions. Each paroxysm embraces the cold, hot, sweating stage, and the intermission, and is termed an interval or revolution.

The type of fever has reference to the length of a revolution. Of these there are three principal and two minor. Where the fever makes a revolution in twenty-four hours, it is termed a quotidian type, the fever occurring every day. When it requires forty-eight hours for a revolution, it is termed a tertian type, the fever occurring every third day. Where seventy-two hours are required for a revolution, it is termed a quartan, the fever occurring every fourth day. There may be two revolutions in twenty-four hours, two paroxysms occurring the same day; this is termed a double quotidian; or there may be a recurrence each day, but at different hours, yet each alternate day the paroxysm occurs at the same hour, the fever observing a perfect rhythm; this is termed a double tertian. Other types have been mentioned of long duration, such as quintan, sextan, septan, and octan, although these must be extremely rare, and but few have had the privilege of noticing them.

There has also been recorded another singular type, where two paroxysms occur one day and none the next, called a duplicated or doubled tertian, or two paroxysms one day and one the next. A fever occurring at an earlier hour each day is called anticipating, while one that occurs at a later hour each day is termed deferring, and one that observes no regular time is termed an erratic type. By reference to the diagram the types may be readily recognized.

INFECTIOUS DISEASES.

TYPES.	MON.	TUES.	WED.	THUR.	FRID.	SAT.	SUN.	MON.	TUES.	WED.
Quotidian <i>chill as occurring</i> A. M.	9	9	9	9	9	9	9	9	9	9
Tertian " "	9		9		9		9		9	
Quartan " "	9			9			9			9
Double A. M.	9	9	9	9	9	9	9	9	9	9
Quotidian . . . P. M.	3	3	3	3	3	3	3	3	3	3
Double, A. M.	9		9		9		9		9	
Tertian, P. M.		3		3		3		3		3
Quintan, A. M.	9				9				9	
Sextan, A. M.	9					9				
Septan, A. M.	9						9			
Octan, A. M.	9							9		
Duplicated A. M. or Doubled Tertian, P. M.	9 3		9 3		9 3		9 3		9 3	
Triple Tertian, . . . A. M. P. M.	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12
Anticipating,	9	8	7	6	5	4	3	2	1	
Deferring,	9	10	11	12	1	2	3	4	5	
Erratic,	9	12	8	3	11	4	1	6	5	

Intermittent.—This class may be subdivided, clinically, into simple, inflammatory, gastric, masked, pernicious, and chronic intermittent. The period of incubation depends upon the type of the fever—the tertian about ten days, the quartan ten to fifteen days, the time required for the development of a sufficient number of bacilli or toxin to so forcibly impress the blood as to bring on the paroxysm.

Symptoms.—Incubation.—Although the invasion may be sudden, prodromal symptoms often precede the chill for a few days. They are malaise, languor, listlessness, headache, and a general tired feeling, impaired appetite, and more or less torpor of the excretory organs. The skin is sallow or tawny, and sometimes dry. Each day finds the patient feeling more uncomfortable, till it terminates in a chill.

Cold Stage.—The cold stage varies as to length and character. It may begin with a prolonged rigor, the patient shaking vigorously, his teeth will chatter, and he will be unable to control the convulsive movements; or the invasion may be more gradual; the patient will yawn and stretch, there are chilly sensations that drive him to the fire. There is pain in the head and a general aching of the body. The tongue is dry, with a white coating, and the patient experiences great thirst; the lips are blue, as are also the fingers; the skin is dry and contracted, giving it a roughened appearance, commonly called goose-flesh—*Cutis anserina*. There is frequently nausea, and sometimes vomiting. The pulse is small but frequent, and the respiration is short and quick. Although the patient feels cold to the touch, if the thermometer be used we will find a temperature ranging from 101° to 103° . This cold stage may last from a few minutes to two or three hours.

Hot Stage.—As the cold stage draws to a close, hot flashes alternate with the chilly sensations, which rapidly increase till all sensations of coldness disappear and the hot stage or period of reaction has full sway. The respiration is full and rapid, the pulse quick and bounding, the face flushed, with throbbing of the carotids; increased pain in the head with restlessness; the tongue is dry and parched, and thirst is constant; the skin is dry and constricted, urine is scanty and high colored, and there is constipation. The temperature may reach 106° or 107° . This stage, like the cold one, may vary as to length of time, from one or two hours to eight or ten hours.

Sweating Stage.—After two or more hours of fever, the temperature begins to fall, the pain in the head ceases, and the sweating stage, or period of excretion, has replaced the former stage. The skin becomes moist, with sometimes profuse perspiration; the secretion from the kidneys is established, is less highly colored, and deposits a sediment. All the unpleasant symptoms disappear, and the patient pronounces himself well.

Intermission.—The stage of excretion is followed by a period of health, of longer or shorter duration, according to the type of the fever. This is followed, in turn, by the cold, hot, and sweating stages, and the fever is made up of these exacerbations and intermissions.

Diagnosis.—The diagnosis is readily made after the fever has made one revolution. The distinct intermission, the temperature becoming normal between the exacerbations, the sallow complexion, the fullness and tenderness of spleen, remove all doubt as to the diagnosis.

Prognosis.—The prognosis is always favorable.

Treatment.—We hear so much of the hematozoa as a cause of malaria, that a large part of the profession takes for granted that an agent which will destroy these micro-organisms will be a specific for the disease. Quinine has been found equal to the test, and the germs disappear upon its administration; hence it is regarded as a specific for intermittents. Yet I am sure that every physician of experience has met cases where this Samson has failed to cure his patient. While quinine is our best anti-periodic and will break the fever, one must know how much to use and when to use it.

The cold stage is usually of short duration and rarely calls for treatment; where long continued, we resort to stimulants externally. The patient may be enveloped in hot blankets, and hot-water bottles applied to the back, sides, and extremities. Internally, ten, twenty, or thirty drops of chloroform administered in syrup may be given every twenty minutes, till reaction is established.

Sedatives.—We now commence our sedatives, aconite and veratrum. In this fever we generally have excess of heart-power, which is shown by the full, bounding pulse and throbbing of the carotids. With this condition there is great excitation of the nervous system, and we combine gelsemium.

℞ Veratrum.....xx to xxx gtt.
 Gelsemium.....xv gtt.
 Waterʒiv. M.
 Sig. A teaspoonful every one or two hours.

These agents shorten and modify the fever, and early establish the secretions, the skin soon becoming moist under the use of veratrum.

Aconite.—If the pulse be small and frequent, aconite replaces the veratrum.

Rhus.—Where there is irritability of the cerebro-spinal centers, as will be shown by the small, hard pulse, restless condition, elevated papilla on tongue, irritability of stomach, we prescribe,—

℞ Aconite.....gtt. v.
 Rhus.....gtt. viii.
 Aqua Dest.....ʒiv. M.
 Sig. A teaspoonful every hour.

Belladonna.—Where there is marked capillary congestion, which will be shown by the small pulse, the dull expression of face, with dilated pupils, we combine belladonna with our sedative:

℞ Aconite.....gtt. v.
 Belladonna.....gtt. x.
 Aqua Dest.....ʒiv. M.
 Sig. A teaspoonful every hour.

These agents not only shorten the fever, but prepare the system for the administration of the antiperiodic during the intermission. Where the temperature is very high, the wet-sheet pack may be used in addition to the sedative.

Quinine.—Success in the use of quinine depends upon the condition of the stomach to absorb it, the amount to be given, and the time of its administration. The tongue must be moist and comparatively clean, or the agent will fail. The amount will be fifteen grains, administered in broken doses, or, if there be time but for a single dose before the expected chill, administer ten grains. I think that the efficiency of quinia is increased by the addition of phosphate of hydrastine. This was a favorite

prescription of my father's, and patients came for miles to procure the old yellow powders :

℞ Quinia.....grs. xv.
Hydrastine Phosphate.....grs. vi. M.

Divide into three powders, and give one every two or three hours during the intermission, so that the last will come one hour before the expected chill. This may be increased or diminished as the case may require. It may be administered in capsules or solution. I would advise against the use of pills, unless the physician prepares them himself, and knows that they are freshly made. Many pills that are on the market are old and insoluble, and are often passed from the bowels unchanged.

A solution of quinia with syrup of yerba santa makes a quite palatable combination, and where the patient can not swallow a capsule, this is a desirable form. Many like the action of prussiate of iron with quinia as follows :

℞ Quinia.....grs. xv.
Prussiate Iron.....grs. x. M.

Divide into three powders, and give as above.

With a return of a new exacerbation, the sedatives are to be repeated, and with the return of the intermission, we again resort to quinia. Usually in simple intermittent, the paroxysm is arrested at the end of the second or third revolution. To prevent a return, it is well to continue the quinia, in small doses, for two or three days after the fever is arrested, and every seventh day for three or four weeks.

If there be torpor of the liver and bowels, podophyllin and leptandrin may be administered; or where there is portal congestion with swelling of spleen, chionanthus and polymnia will prove of great benefit. An inunction of quinia and lard will prove highly beneficial :

℞ Lard℥ii.
Quinia℥i. M.

Rub over the abdomen, in the groins and in the axilla, every three or four hours.

Strychnia.—There are some patients who can not take quinia ; a very good substitute is strychnia, given hypodermically, 1/30 of a grain one hour before the chill.

Fowler's solution of arsenic is also a good agent where the skin is doughy, tongue small, with a mucoid coating and inclined to a bluish cast:

℞ Fowler's Solution.....gtt. xx.
 Aqua Dest.....℥iv. M.
 Sig. A teaspoonful every hour during the intermission.

GASTRIC INTERMITTENT.

This classification is peculiarly appropriate to those cases where there is great gastro-intestinal disturbance, although medical writers do not generally accord it a distinct place. There are two conditions that are met sufficiently often to merit a consideration.

Irritative Form.—The gastro-intestinal irritation is shown by the contracted and pointed tongue, reddened at tip and edges, slightly coated in center and by a bad taste in the mouth, with nausea and frequent vomiting. There is tenderness in the epigastric region; there is also great irritation of the nervous system, face flushed, eyes bright and contracted, intense headache, and sometimes delirium. The skin is hot, dry, and constricted, the urine is scanty and high colored; there is constipation, sometimes followed by diarrhea. The chill is usually short and the febrile reaction quite high; the intermission is not so perfect as in the simple form.

Atonic Form.—The second condition is where there is atony and torpor. The chill is prolonged, although reaction is not so high; the tongue is broad, pale, and flabby and more or less coated with a dirty-yellowish, pasty, mucoid coating. There is a sense of weight and oppression in the epigastrium. The appetite is impaired; there is more or less nausea, but rarely vomiting. The skin is yellow, doughy, and inelastic, and inclined to be cool. The bowels are constipated, the stools being clay colored; the urine is but slightly decreased in quantity, but pale, frothy, and of low specific gravity. The patient is dull and listless, with a dull headache; the extremities are inclined to be cold. Either one of these forms is easily recognized.

The treatment will consist in correcting the condition of the

stomach and bowels, bringing the fever back to the simple form, when antiperiodics will be used as already indicated. To overcome the irritation, use counter-irritants over the stomach, either a sinapism or the cold pack. Internally, give the small dose of ipecac or subnitrate of bismuth in mint water.

℞ Ipecac.....gtt. v.
Waterʒiv. M.
Sig. Teaspoonful every twenty or thirty minutes.

Or,

℞ Subnitrate of Bismuth.....ʒi.
Mint Water.....ʒiv. M.

Or,

℞ Aconite.....gtt. v.
Rhus Tox.....gtt. x.
Waterʒiv. M.
Sig. Teaspoonful every hour.

Where there is great torpor and atony, this must be corrected or our antiperiodics will not be absorbed.

Sodium Sulphite.—For the moist, pasty, dirty tongue give sulphite of soda, in twenty-grain doses, every three hours. If the tongue is broad and flabby, but clean,—

℞ Nux Vomica.....gtt. v.
Waterʒiv. M.
Sig. Teaspoonful every hour.

Podophyllin and Leptandrin.—For the torpor of the liver,—

℞ Podophyllin.
Leptandrin.....aa ʒi.
Waterʒiv. M.
Sig. A teaspoonful every two hours.

If the tissues are full and there is puffiness under the eyes, with thick tongue and doughy skin,—

℞ Potassium Acetate.....ʒss.
Aqua Dest.....ʒiv. M.
Sig. A teaspoonful every three or four hours, the patient drinking freely of water with each dose.

Belladonna.—Where the tongue is clean, but thick, with dull pains in the head, pupils dilated, pulse small,—

℞ *Belladonna*.....gtt. x.
Aqua Dest......℥iv. M.
 Sig. A teaspoonful every four hours. Then
 use quinia.

MASKED INTERMITTENT.

In malarial sections there are certain well-defined diseased conditions that occur with marked regularity; in fact, the period is as well marked as in any of the intermittents, but with this difference,—there is no fever. Almost every disease may have a distinct periodic complication, and need special treatment, but the neuralgias are the ones commonly embraced under the head of masked intermittents.

The nerves most frequently involved are the supraorbital and infraorbital branches of the trigeminus. The headache is intense and persistent. Occipital pain is also quite common, while intercostal and sciatic neuralgias are of frequent occurrence. Earache may occur at a certain hour each day.

In all of these forms the pain usually begins in the morning, increases in intensity during the day till just before the close of an attack. Croup often shows a tendency to occur periodically, and my first recollection of this disease, as taught me by my father, was the giving of quinia during the afternoon following an attack. We occasionally meet with a case of diarrhea or dysentery, occurring only in the morning. In any or all of these malaria should be suspected, and antiperiodics administered in conjunction with the indicated remedy.

PERNICIOUS INTERMITTENT.

Synonyms.—Congestive Intermittent; Congestive Chills; Malignant Intermittent.

Definition.—An intense intermittent, where the paludal poison is so intense as to rapidly break down the blood, resulting in a local or general congestion which early threatens life.

Etiology.—The etiology is the same as that of the other intermittents.

Pathology.—An examination of the blood shows an abundant destruction of the red corpuscles and the presence of black pigment derived from the coloring matter of the broken-down corpuscles. The red corpuscles are sometimes crenated; but as this is often seen in other fevers, it is not characteristic.

The increase in the pigment is the most characteristic lesion of the blood, and is deposited in the tissues and organs of the body; notably the spleen, liver, kidneys, brain, and spinal cord. The lesion of the spleen is characteristic, which consists of hypertrophy and softening, the contents consisting of dark-colored pulp, or black, bloody fluid. There may be thickening of the capsule of the spleen. Infarcts may occur, followed by abscess or gangrene.

The liver is hypertrophied and softened with extravasation of blood; sometimes there is fatty degeneration. The lesions of the kidneys are also similar; viz., congestion followed by degeneration. The lungs, especially the lower lobes, are engorged, and in the severer forms hemorrhagic infarctions are found.

Symptoms.—The symptoms depend upon the type, there being the algid, comatose, hemorrhagic, gastro-enteric, and icteric.

Algid.—This is commonly called congestive chills. It may be preceded by one or more paroxysms of a simple intermittent, or the first chill shows evidences of great congestion. There is marked prostration from the beginning, and the patient, if he attempts to walk, staggers as though under the influence of intoxicants. The early rigors are followed by extreme coldness of the surface; the pulse becomes small and feeble, breathing more or less labored. The eyes are dull and lusterless; the mind becomes early confused, and the patient answers slowly and with difficulty.

The coldness of the surface gradually increases, and the skin, at first contracted, becomes relaxed, and great drops of cold sweat stand upon the face and body, like transparent beads. The face is now blue, the eyes sunken, and the patient oblivious to his surroundings. The pulse grows more feeble, respiration becomes labored and slow. The patient slips toward the foot of the bed, and death soon terminates the struggle. The temperature during

this severe cold stage, strange to say, is very high. One case which I examined registered 108 about one hour before death.

Where not so severe, the cold stage is followed by reaction, which come up slowly. The heat of the body is gradually restored, the pulse gains in strength, the mind becomes clear, and reaction is fully established. In exceptional cases reaction is very high, with full, bounding pulse and active delirium, which soon gives way to coma.

Comatose.—This, like the preceding form, may be preceded by one or more paroxysms of simple intermittent, to be followed by a reaction, in which the patient early passes into a comatose condition, resembling apoplexy. The face is but slightly flushed and dusky; the pupils are dilated; breathing is labored, and sometimes stertorous; the coma becomes more profound, and may continue for hours, when the skin becomes relaxed, and the patient breaks out with a profuse perspiration; consciousness is regained, and the paroxysm is over; but after a short intermission there may be another exacerbation equal in severity, or more intense, ending fatally.

Hemorrhagic.—In this form the chill is severe and prolonged, and, with reaction, hemorrhage occurs. The urine is scanty and bloody, while the hemorrhage may take place from the uterus, rectum, mouth, or nose. Ecchymotic spots may appear all over the body. The sallowness of the skin assumes a deeper hue, the icteric color being very marked. There is not so much coma in this form; in fact, the patient usually retains consciousness throughout.

Gastro-Enteric and Icteric.—These forms are more a complication of the other three than separate varieties or types. When these complications occur they render the case more grave.

Diagnosis.—The severity of the different types, as recognized by the grave symptoms, the intense congestion and marked depression, the deathlike coldness and the marked coma, render the diagnosis comparatively easy.

Prognosis.—The prognosis must be guarded; if seen early, and active measures be used, many cases may be saved.

Treatment.—This is the most severe form of malarial fever, and the only variety that is apt to prove fatal, and requires not only prompt, but very active and somewhat heroic measures.

Our first object is to bring about reaction and overcome the great congestion. Stimulants externally and by mouth, and hypodermically, will be the order of treatment. Our patient is deathly cold, and, to determine heat to the surface, we will order blankets to be wrung out of hot mustard or capsicum water, and envelop the patient in them, at the same time directing hot-water bottles, stove-lids, or, if in the country, hot corn, placed about the body to keep up the heat. While the attendant is getting hot water, utilize the time by rubbing the patient briskly with dry mustard; improve every moment, for your patient's life is at stake.

If the tongue be heavily coated, as in all probability it will, administer an emetic of ipecac or lobelia, to which has been added mustard or capsicum. This may be followed by the old compound cajuput mixture every ten or twenty minutes or an infusion of capsicum.

The stomach is very torpid, however, and remedies are but slowly absorbed, so we give strychnia, one-twentieth grain, hypodermically, or a five per cent solution of camphor and ether. As the system begins to respond to the action of the stimulants, we will administer subcutaneously ten, twenty, or thirty grains of the bisulphate of quinia, and repeat in an hour or two till reaction is fully established. It is always better in these extreme cases to give quinia hypodermically, owing to the slow action of the absorbents.

During the intermission, quinia in somewhat larger doses than in simple intermittent will be given. The nasty, dirty, pasty coating on the tongue, in nearly all cases, shows not only acidity, but sepsis. It calls for sulphite of soda; of a saturated solution we will give a tablespoonful every two or three hours. If there be capillary congestion, which will be shown by dull and dilated pupils, belladonna will be called for, and with this we may combine successfully nux vomica:

℞ Specific Belladonna.....gtt. x.
 Specific Nux Vomica.....gtt. v.
 Aqua Dest.....℥iv. M.
 Sig. A teaspoonful every hour.

From the favorable reports of subcutaneous injections of saline solutions in the stage of collapse in cholera, and from what we have seen of its benefit in surgical collapse, I would suggest its use in the cold stage of this fever.

In the comatose form, the medication should be active. Jab-
 orandi or pilocarpin should be given to establish diaphoresis, re-
 duce the temperature, and overcome congestion; as in the other
 form, quinia in twenty or thirty grain doses will be used hypo-
 dermically.

For congestion of the liver and the spleen, which occurs in all
 pernicious intermittents, we think of chionanthus and polymnia
 uvedalia. One drachm of the former and two drachms of the
 latter to four ounces of water, teaspoonful every one or two hours.
 Where febrile reaction is intense and delirium active, give,—

R Veratrum.

Gelsemiumaa ʒi.

Aqua Dest.....ʒiv. M.

Sig. A teaspoonful every one, two, or three
 hours.

Where there is gastric irritation and persistent vomiting, it is
 well to wash out the stomach by having the patient drink freely
 of warm water, to which a little ipecac or lobelia has been added.

Wrongs of the Liver and Spleen.—Enlargement of the spleen
 and congestion of the portal circulation are among the chief
 characteristics of this disease, and remedies looking to a correc-
 tion of these wrongs will early be called for. Fortunately these
 remedies may be combined or alternated with any of the above
 treatment.

Polymnia Uvedalia.—Where the spleen is enlarged with en-
 gorgement of the liver and mesenteric glands, and there is but
 little or no pain, and the tissues are doughy, uvedalia internally
 and locally will be the specific. One or two drachms to water
 four ounces, teaspoonful every three hours. For the external use,
 either a hot infusion or the ointment may be used, care being
 taken to rub it in with brisk friction.

Chionanthus.—Where the engorgement of the liver is fol-
 lowed by jaundice, and there is tenderness in right hypochondriac
 region, chionanthus in five or ten drop doses will effect a cure.

Ceonothus.—This is an agent that acts nicely where there is
 puffiness of the face, doughy skin, and pain in spleen and liver;
 two to five drops of ceonothus in water every two or three hours
 will prove beneficial.

Carduus Marianus.—Those who have read Burnet's little

book on "Diseases of the Liver" will prescribe carduus for the big spleen; if the patient is despondent, bordering on melancholy, the indication for its use will be still more pronounced.

Grindelia Squarrosa.—Dr. Webster speaks very highly of this remedy with enlargement of spleen with dyspeptic symptoms of long standing, while Professor Bundy declares that for these enlarged spleens there is a "Balm in Gilead," and that this is found in *grindelia squarrosa*.

Chelidonium.—Where there is enlargement of the liver, and the skin is of a bronze color, the tongue thick and full and of the same yellowish-green tinge, two drops of chelidoneum every three hours will give good results. These remedies are somewhat similar in their action, and two or three may be combined, or two may be given one day and two others the following day, in this way getting the benefit of the entire group.

Excretions from the Skin.—There is a relation between excretion and ague, and remedies, that increase the function of the skin, kidneys, and bowels, will prove curative to the disease. There are cases where the ague is perpetuated by the wrong of the skin; if harsh and dry, the proper bath is to be commended. If doughy, or leathery and inelastic, quinine inunction is invaluable.

R Quinia	ʒi.
Lard	ʒi.
Oil of Cinnamon.....	gtt. x to xx. M.

To be rubbed into groin, axilla, and over abdomen every three or four hours, using considerable friction.

Kidneys.—Where the tissues are full, puffiness under the eyes, broad, thick, full tongue, scanty secretion of the kidneys, acetate of potassium is our best agent. Place half an ounce in four ounces of water, and give teaspoonful every three or four hours, the patient drinking freely of water after each dose.

Cuprum.—Where the skin is of a greenish hue, and the tongue of the same color, the blood is of poor quality and a blood maker is needed, cuprum will prove curative. One of my first cases of chronic ague, nearly twenty years ago, yielded to the small dose of tincture of copper after all other agents had failed.

Arsenic.—Where the tongue is small, pale, and slimy, and of a bluish cast, and where the pulse is small and feeble, the skin

lifeless and inelastic, the small dose of Fowler's solution will be found effective. There may be some structural complications that will need to be corrected before a cure can be effected. An old metritis, giving rise to dysmenorrhea, or menorrhagia, or to an amenorrhea, will continue indefinitely the periodic disease, as will wrongs of the rectum or urethra, and in all these persistent malarias a careful examination must be made, that the offending part may be corrected. The convalescent period must be carefully watched, and any symptoms of a recurrence be met by the judicious use of quinia.

CHRONIC MALARIAL FEVER.

Synonyms.—Malarial Cachexia; Chronic Ague.

Definition.—A persistent fever of an irregular type, partaking of the nature of both the intermittent and remittent fevers, and characterized by anemia; the skin being either sallow, doughy, and inelastic, or dry and constricted; there is enlargement of the spleen, congestion of the portal circulation, and disordered condition of the digestive apparatus.

Pathology.—Anemia is quite marked, the malarial poison causing a wholesale destruction of the red corpuscles. The viscera, especially the spleen, liver, and kidneys, are dark red, owing to a deposit of the pigment of the blood following the breaking down of the corpuscles.

The spleen is enlarged, sometimes filling the left abdominal cavity. There is congestion of the liver, and the kidneys show extravasation of blood. There may be albuminuria and dropsical effusion. The skin presents a jaundiced appearance.

Symptoms.—The symptoms of chronic malaria are legion; the blood being deranged, nearly every organ and tissue is affected, hence the great variety of symptoms. There is generally disturbance of the circulation. This may result from the enlarged spleen pressing against the diaphragm, and which, by crowding the heart, gives rise to frequent palpitations or irregularity in its beat.

In severe cases, where there is marked congestion of the liver, there will be repeated attacks of asthma, owing to pressure of the liver against the diaphragm, and this in turn against the lungs, thus impeding a free respiration. The tongue is nearly always

coated, with a disagreeable taste in the mouth. There is derangement of the stomach, which gives rise to many symptoms of dyspepsia. There may be gastric irritation, of which nausea and retching are prominent features; here the tongue is narrow and elongated, or there is atony, with fullness of tissue, the tongue being broad and full.

The liver being congested in nearly all cases, we have, as a result, an icteric hue to the skin. The abdomen is enlarged, owing to hypertrophy of the liver and spleen; hence there is great dullness on percussion. There is a dull, aching pain in the loins, and not infrequently dropsy, as a result of impaired function of the kidneys. The skin is usually dry and harsh, although it may be relaxed, cool, and doughy. There is constipation, alternated with diarrhea. Dysentery is not an infrequent complication. With these various symptoms, there is associated the periodicity of malaria.

The nervous system feels the influence of the poison very early, and headache and general myalgia naturally follow.

The chill may occur with the marked regularity of the simple intermittent, or it may be erratic, occurring when least expected. Again, there may be an absence of the cold stage, but occasional exacerbations of fever of an irregular type; or the disease may be characterized by periodic neuralgias, such as facial, bronchial, or sciatic. Again, the periodic character may be so slight that, if we are not careful in our examination, we will overlook entirely the true nature of the disease.

Diagnosis.—This is generally easy. The history is of great importance, the patient having resided in a malarial section and having suffered from frequent acute attacks. The cachetic appearance due to the marked anemia; the jaundiced, waxy, or doughy skin; the enlarged spleen, which is characteristic; the congestion of the liver, and the periodical manifestation which a careful study will reveal, point conclusively to the nature of the affection.

Prognosis.—The prognosis will depend to some extent upon the length of time, or the stage of the disease. If the engorgement of the liver and spleen has been followed by more or less degeneration of these organs, or if there is dropsy with Bright's disease, the case is unfavorable, and, while some relief may be promised, a cure is out of the question.

Treatment.—While quinia is a very important agent in malaria, there are few cases of a chronic nature which it will cure. The complication, whatever it may be, must be overcome before it will be of any use, and many cases will be relieved without the administration of a single dose of quinia. If periodicity is the most distinctive feature, the basal lesion, quinia will cure, but in the large majority of instances this is not the case.

The early Eclectics were peculiarly successful in the treatment of this disease, and I can not do better than to reproduce a large part of the treatment as given in "Scudder's Practice." I believe the practitioner will find it the only rational method, and an experience of twenty-five years confirms it.

"Remedies that Influence the Circulation.—I claim that any case of intermittent fever showing increased temperature, increased frequency of pulse, torpor of the organs of excretion, and irritation of the nervous system, should have the sedative before giving quinine, as a part of a good treatment. It is true that persons suffering from ague do not like to wait the slow actions of remedies: they want it broken at once; yet if they are told that the slower cure is the more rational one, they will take it in preference.

"A man showing the wrongs that would ordinarily call for sedatives, may have the ague broken by antiperiodics; but it returns again and again, and gives us a chronic case.

"Aconite.—If the patient has a small, frequent pulse—usually small and hard during febrile reaction, small and soft in the intermission, the tissues being somewhat contracted, color not very much changed—I would recommend the administration of aconite, say,—

"℞ Tincture Aconite.....gtt. v to x.

"Water℥iv. M.

"Sig. A teaspoonful every one or two hours.

"Veratrum.—Veratrum does not seem to have as large a field of usefulness as aconite, but still we have an occasional case where it is useful. The pulse is frequent and full, the tissues full, the patient full-blooded. Prescribe it in the usual dose:

"℞ Tincture Veratrum.....gtt. xx to xxx.

"Water℥iv. M.

"Sig. A teaspoonful every one or two hours.

"Lobelia.—Lobelia is used for its influence upon the circulation, as well as an emetic, and it is this first use we wish to study here. There is a sense of precordial oppression, with difficulty in respiration, and a full, oppressed pulse; we give the tincture of the seed in doses just short of nausea. In the olden time an extract of lobelia was combined with black pepper or piperine, as in the following:

"℞ Extract of Lobelia.....gr. x.
 "Powdered Black Pepper.....ʒii. M.
 "Sig. Make three grain pills, and give one every hour.

"Gelsemium.—Though the influence of gelsemium is primarily upon the cerebro-spinal centers, it also influences the circulation, and we may study it here. In the ordinary treatment of ague, many physicians use gelsemium associated with quinine where there is evidence of an excited nervous system. The flushed face, bright eyes, contracted pupils, increased heat of the scalp, restlessness, and irritability, are the common symptoms indicating it.

"℞ Gelsemium.....gtt. xx to xl.
 "Waterʒiv. M.
 "Sig. A teaspoonful every three hours.

"Belladonna.—Belladonna is the remedy for congestion of the nerve centers, as marked by drowsiness and tendency to coma during the paroxysm of fever. The face is dull, expressionless, the eyes dull, the pupils dilated, and indeed there is want of expression in all parts of the body. In the recent disease, we give belladonna, in such cases, as a preparation for quinine, and in a chronic case, where the symptoms were marked, we would expect it to cure. Usually there is the indication for aconite as well, and we would give the two together, as,—

"℞ Tincture Belladonna.....gtt. x.
 "Tincture Aconite.....gtt. v.
 "Waterʒiv. M.
 "Sig. A teaspoonful every one or two hours.

"There are other remedies that might be grouped with these, that we sometimes find useful, but the above must suffice for the present.

"Remedies Influencing the Digestive Apparatus and the Spinal and Sympathetic Nervous System.—I think the lesions of innervation associated with wrongs of the digestive apparatus are more important than the functional wrongs of the organs themselves. We never have a wrong of the stomach, bowels, liver, or spleen, that we have not an equal wrong of innervation from the solar plexus, and sometimes of the spinal cord.

"Emetics.—In the olden time the emetic was a prominent means for the cure of chronic ague, either as preparing the way for antiperiodics or serving instead. Even yet, with our abundant means, we find cases in which the emetic is the shortest way to a cure. The case is well marked, and needs not be mistaken. There is a marked oppression of the nervous system, and oppressed pulse and perspiration, sensations of weight or fullness in the epigastrium, disgust for food, and a tongue broad and heavily coated at the base. In such a case a thorough emetic gives prompt relief.

"Cathartics.—I deprecate the common use of cathartic medicines, and feel confident that many failures, even in the treatment of ague, are due to their injudicious use. Still, if there is evidence of material in the bowels which serves either as a cause of depression or of irritation, it should be removed. Simple constipation is not sufficient to justify their use. The simpler the means, and the milder the action, the better it is for the patient in the ordinary case.

"Podophyllin.—There is a condition of the nervous system, and of the circulation, calling for this remedy, as well as a condition of the digestive apparatus. In the recent disease there is a case in which podophyllin prepares the way for a cure by quinine. There is oppression of mind, of muscular action, of respiration, of the circulation. The tongue is broad, coated from base to tip, the face is full and expressionless, and there is especially *fullness of the veins* with evident impairment of venous circulation. Even the old-fashioned emeto-cathartic with podophyllin serves a good purpose here.

"In a chronic case of ague presenting these symptoms, I should give podophyllin in doses sufficient to obtain its full action.

"In some cases we do not want the decided action of podophyllin. The ague has been arrested for the time, and we are looking to a radical cure. There is an atonic condition of the

stomach, of the intestinal canal, of the organs associated with it, and oppressed innervation from the sympathetic; the patient is dizzy, suffers from dull headache at times, and does not feel like work. In such cases I prescribe podophyllin with hydrastia in small doses, as the following:

“℞ Podophyllin.grs. ii.
 “Phosphate of Hydrastia.grs. x. M.
 “Sig. Make forty pills; one or two may be given
 each day midway between meals.

Nux Vomica.—We use *nux vomica* in the recent disease, where there is nausea, colicky pain in the bowels, pain in the right hypochondrium pointing to the umbilicus, and a yellow sallowness of the skin.

“In some cases of persistent ague these symptoms are very marked, especially the abdominal pain, and an unpleasant color of the surface; then *nux vomica* may cure when the antiperiodic treatment has failed. In some cases I give it alone, in small doses, as,—

“℞ Tinct. *Nux Vomica*.gtt. v.
 “Aqua Dest.℥iv. M.
 “Sig. A teaspoonful every one or two hours.

“It may be alternated with any other remedy indicated, and even with aconite.

“*Alkaline Salts*.—There are cases in which the alkaline salts become important remedies, or even curatives. The broad, pallid tongue is the indication, and when present I would never think of treating a case without the use of a salt, usually of soda.

“*Sodium Sulphite*.—We meet with cases showing distinct indications for this antiseptic salt. The tongue is broad, pallid, and dirty, retrograde metamorphosis is defective, and the tissues look old and inactive. Sulphite of soda will frequently cure these cases, giving it in doses of from ten to twenty grains every three or four hours.

“*Acids*.—While acids may not be curative alone, they will aid other remedies, or prepare the way for other remedies. The deep-red tongue is the indication, and muriatic or lactic acid is the remedy.

“*Uvedalia*.—Among the wrongs arising from continued ague, none are so common and characteristic as enlargement of the

spleen-ague cake. With this disease of the spleen, the ague will continue to recur despite all antiperiodic treatment. In some cases we will find the liver enlarged, evident engorgement of the mesenteric glands, and sometimes general disease of the lymphatics.

"For these cases uvedalia is undoubtedly the specific. We use the ointment of uvedalia as a local remedy, applied over the enlarged spleen or liver, or even over the entire abdomen. It is well to use heat with the application, covering the part with flannel, and passing a warm iron over it. The application should be thorough and repeated every day. Internally, we give it in doses of from one to twenty drops, three or four times a day.

"*Chionanthus*.—We have the still more rare case of chronic ague associated with jaundice, and examination does not show incurable structural disease of the liver. The more common case is one of irritation marked by uneasiness in the right hypochondrium, and tenderness on pressure. In one such case a radical cure resulted from the employment of the tincture of *chionanthus* alone, in doses of ten drops every three hours.

"**Tonics.**—The advantage of a tonic treatment following the breaking of an ague has long been recognized, and good practitioners always examine the patient with reference to their need of this class of remedies. The bitter tonic improves the appetite, and gives better digestion and blood-making, and increases the power of the tissues to appropriate nutrient material, and in this way increases the resisting power of the body to the disease. Many of these also improve innervation through the sympathetic, and thus strengthen the vegetative functions of the body.

"**Restoratives.**—Restoratives are also of importance in many of these cases. There is the indication of a special want of some material in the body, and blood-making and nutrition will not go on well without it, or some organ or tissue can not be made without it. Thus there may be the want of phosphorus, of iron, of sulphur, of silica, as well as of soda or an acid, or food. It may be that the administration of a teaspoonful of the compound syrup of the hypophosphites after each meal will be the one thing wanting to restore the resisting power of the body, or a tablespoonful of cod-liver oil may be the thing wanting to give right combustion and a normal temperature.

"The Excretions.—Physicians have also recognized the relation between excretion and the ague: when excretion was deficient or otherwise changed, the ague would continue.

"Our school of physicians has given more attention to the skin, and have placed remedies to increase its activity among the foremost. There are cases, certainly, in which the ague is perpetuated by a wrong of the skin. With a harsh and dry skin, it is almost impossible to effect a cure, as it is also with a soft and relaxed, doughy or inelastic skin.

"In addition to the usual baths for the different conditions of the surface, let me again call attention to the use of fatty inunction and quinine inunction. Frequently this seems to answer the purpose in both cases. Where the skin is harsh and dry, and where it is doughy and inelastic, it is one of our most efficient means of cure, and I usually order a quinine inunction in the proportion of drachms ss to drachms i to the ounce of lard, and have the body thoroughly rubbed with it once or twice daily. Thorough rubbing is the expression, although a large quantity of the ointment need not be used, and if the skin is inclined to be greasy, it may be rubbed clean with soft flannel.

"Potassium Acetate.—Golding Bird places great stress on obtaining free excretion from the kidneys in these protracted agues; he claimed that cures could be effected by the use of acetate of potash, when all antiperiodics had failed. I know by experience that some of these old agues can be cured by the saline diuretics, and possibly can only be cured by them. Take a case where the tissues are inelastic and sodden, and the renewal of tissue is slow, I should give a solution of potassium acetate in preference to all other means. From one to three drachms is divided into doses very largely diluted with water, and given daily, and continued for one or two weeks.

"Specific Remedies.—Physicians recognize other antiperiodics than quinine, but they must concede their inferiority in the ordinary ague. The other alkaloids of the Peruvian bark are now being used to a considerable extent, although, in the main, the only difference between these and quinine is less cost. Other than these I do not know of any remedies that can be classed with quinine as antiperiodics.

"Cuprum.—We occasionally have a case where copper is the remedy par excellence. My first experience with the remedy was

so successful that I have ever since been an admirer of its curative power. The patient had been shaking with a regularity which is so characteristic of some of these chronic cases. Quinia had been given in large doses and in small doses, but all to no effect. I found the patient with a sallow, doughy skin, the color of the yellow-green cast that one occasionally sees in chronic ague. The tongue was broad and of the same peculiar yellowish-green order. I prescribed tincture cuprum gtt. xx, water \mathfrak{z} iv, teaspoonful every three hours, and in less than ten days the patient considered himself well, although I had the remedy continued for several days longer, for fear of a relapse.

"*Carduus marianus*, *ceanothus*, and *grindelia squarrosa* are remedies that influence the spleen and liver. (See 'Pernicious Intermittent' for their indications, etc.)

"*Arsenic*.—Arsenic is in very common use as a remedy for ague, and sometimes exerts a remarkable influence in effecting a cure. But, as ordinarily used, it sometimes exerts a remarkable influence in the opposite direction, which is quite unpleasant for the patient. Some of the patent 'ague cures' contain arsenic; as, for instance—(I will not name them, as the proprietors are very sensitive on the subject.) I have known a preparation of euonymus, quinine, and Fowler's solution of arsenic used successfully, but I can not recommend it.

"When I use arsenic it is in minute doses for its specific effect. Given a chronic case of ague, with soft, feeble pulse, lifeless inelastic skin, and tongue pale, small, and coated with slimy fur, I would think of the arsenic pellets. Take of the medium-sized Homeopathic pellets sufficient to fill an ounce bottle half full, drop on them five drops of Fowler's solution of arsenic, shake them well together, and, when dry, we have the small quantity. Ten of these may be given every three hours. It is well to say that the indications for the large and small doses of arsenic in the treatment of chronic intermittents are just the opposites of one another.

"*Nitric Acid*.—Among the positive remedies used in the cure of protracted ague we must not forget nitric acid. The indication is very distinct, a violent coloration of the tongue, and more slightly of any part where the circulation shows free. In the typical case the violet color is transparent, seeming like a

glaze on the tongue; it is never a dull, solid color. In these cases I prescribe,—

“℞ Nitric Acid.....gtt. xx.
 “Aqua Dest.....aa ℥ii.
 “Simple Syrup. M.
 “Sig. A teaspoonful every three hours.

“**Complications.**—It may be remarked, in conclusion, that sometimes a complication of functional or structural disease will continue the ague, in the same way that the malarial poison will continue a local disease. Thus I have known an ague continued by amenorrhea, by dysmenorrhea, and by menorrhagia, as I have by disease of kidneys, bladder, urethra, or other structure. It is safe in all cases to take it for granted that this is the fact, and in intractable ague associated with local or functional diseases, to adopt a treatment for their cure.

“Lastly it may be said, whenever there is a special indication for any remedy, it will prove a remedy in ague, as it would in other diseases. It may be preparatory for the use of the anti-periodics, associated with them, or it may cure alone. This advice is therefore given, to examine each patient carefully with reference to symptoms calling for special remedies, and to use remedies thus indicated.”

REMITTENT FEVER.

Synonyms.—Bilious Fever; Estivo-Autumnal Fever; Gastric Fever.

Definition.—One of the divisions of malarial fever in which there is but one revolution of the disease, the hot stage being greatly prolonged and made up of exacerbations and *remissions*.

Etiology.—The estivo-autumnal parasites already described are the specific micro-organisms that give rise to this form of malaria. The same conditions that favor intermittent fever, predispose to remittent fever.

The severity of the disease depends largely upon climatic conditions, being mild in high and temperate regions, and increases in intensity as we approach the tropics. It prevails more extensively in the fall months, although it is seen during the entire year.

Pathology.—The morbid changes depend largely upon the length of time the disease has existed, and also upon the frequency of reinfection. The pathology does not differ greatly in character from that of intermittent fever, the difference being only in degree.

There is pigmentation of the spleen, liver, and brain, and the blood contains broken-down blood disks or degenerated pigment. The spleen in recent cases is swollen and soft, while in protracted cases, or where there has been frequent infection, it is firm and permanently enlarged.

The liver is dark in color and undergoes similar changes.

The brain is of a dark, almost black, color. Other organs, together with the lymphatic glands and the skin, are deeply pigmented.

Symptoms.—The forming stage is quite variable, and some cases appear suddenly, without any prodromal symptoms; usually, however, there is a more gradual invasion, lasting from two to five or six days.

The first evidence of the disease is a sense of weariness on slight exertion, which, increasing, results in general malaise, loss of appetite, headache, with general aching of the body. The bowels are constipated, the skin dry, and the urine scanty and high-colored. The tongue is coated, there is a bitter taste in the mouth accompanied by nausea, and, as the chill ushers in the disease, vomiting of bilious matter follows.

Occasionally, for twenty-four or forty-eight hours, an intermittent fever precedes the disease.

Cold Stage.—The chill is usually shorter in duration than that of intermittent fever, although, while it lasts, it is quite severe. The nausea which precedes this stage, frequently terminates in vomiting during the chill or as soon as reaction occurs. In the exceptional case, the cold stage can not be recognized from that of the intermittent type.

Hot Stage.—Although the temperature may have been two or three degrees above the normal during the cold stage, with the termination of the chill there is a rapid rise of temperature, often reaching 105° or 106° within ten or twelve hours after the chill. The pulse is full, strong, and bounding; the respiration hurried and uneven; the skin dry, harsh, and constricted; the eyes red

and suffused; the face flushed and turgid, and the patient is extremely restless. The tongue is coated with a dirty, yellowish fur; there is tenderness over the epigastrium, and vomiting of bilious material aggravates the patient's suffering. The patient complains of pain in the head, back, and limbs, it being sometimes extremely severe.

The secretions are markedly arrested, the bowels being constipated and the urine scanty, high-colored, and frequently colored with bile. There is restlessness, and, in nervous patients, delirium may ensue, or should there be marked congestion it will be shown by dullness and stupor.

These symptoms continue from ten to twenty hours, when the temperature begins to decline; the pulse is less rapid, loses its full, bounding character, the skin becomes relaxed, and a slight perspiration is noticed about the head, face, and neck; the pain in head and back subsides, the vomiting ceases, and the patient becomes quite comfortable, and frequently drops into a quiet sleep.

This constitutes the period of remission, and usually occurs each day, generally in the morning, although there may be two remissions daily, or they may occur every third or fourth day, resembling a tertian or quartan intermittent.

The time embraced in a remission varies: in one it may be very slight and of short duration, while in another patient it may be quite prolonged, and might even be considered an intermission did not the thermometer show an elevation of temperature.

Following the remission, the temperature again rises with all its accompanying symptoms, and the fever is made up of exacerbations and remissions.

Bilious fever can not be said to run a uniform course. In some, the fever is quite mild, the remission pronounced, and but little, if any, gastric disturbance. In others, as the disease progresses, it loses its remittent character, and merges into a continued fever with typhoid symptoms.

Again, we occasionally meet with cases where there is great congestion of the spleen and liver, and when the remission occurs, there is but little reactive power, the skin becoming relaxed, the patient is bathed with a cold, clammy perspiration, the pulse is small and feeble, the extremities are cold, the breathing shallow and labored, coma appears, and the patient dies during the remission.

Complications.—"Remittent fever is frequently rendered difficult to treat by the existence of some local affection. Irritation of the stomach and duodenum is probably the most frequent complication; the symptoms are, continued nausea and vomiting, tenderness on pressure over the epigastrium, with a feeling, frequently, of insufferable oppression in that region.

"Determination to the brain is also met with in the severer forms of the disease, indicated by symptoms of cerebral excitement, followed by stupor, low delirium, and coma.

"Disease of the liver is also of frequent occurrence in warm climates, most frequently manifested by symptoms of irritation and increased secretion of acrid bile, which produces irritation of the bowels; but sometimes by congestion, the secretion being arrested.

"Various pulmonary affections are met with in this disease, especially bronchitis and pneumonia, of a congestive form."

Diagnosis.—The diagnosis is usually not difficult after one or two remissions. Where the remissions are slight, it might be mistaken for typhoid, although an absence of the eruption, and the much less prostration, should enable one to distinguish the one from the other. When complications occur early in the disease, the symptoms may be so masked as to make a correct diagnosis somewhat difficult.

Prognosis.—The prognosis should always be favorable if the patient be seen early in the disease, or unless grave complications arise.

Treatment.—In simple remittent fever, the object of our treatment will be to lessen the fever, establish the secretions, and lengthen the remission, that we may get the full effect of our antiperiodic, quinine. This is usually accomplished early in the disease, and the patient is convalescent in from four to six days.

To accomplish this end, we select aconite or veratrum, according to the condition of the circulation; aconite for the small pulse, veratrum for the full and bounding pulse, and combine with the sedative gelsemium, where the patient is restless and nervous. This modifies the fever and favors the reception of the quinine during the remission. If there is irritability of the stomach, this can be corrected by small doses of aconite and ipecac, rhus tox., or bismuth and mint water.

As the fever begins to subside, and the tongue and skin become moist, we begin the administration of quinia:

℞ Sulphate of Quinia.....grs. xv.
Phosphate of Hydrastine.....grs. x. M.

Sig. Divide into three powders, and give one every two or three hours during the remission.

The sedative may be continued during the remission, but at longer intervals. With the reappearance of the fever the sedative treatment is given as before, and the antiperiodic the following remission. It is noticed that each exacerbation becomes lighter and the remission more marked, the disease early terminating in health. The more severe cases will need additional study and treatment.

Remittent fever is rendered severe by certain complications, but, if recognized early, can be corrected by a selection of the proper remedies. The complications most frequently found are those of the gastro-intestinal tract, the blood, the respiratory tract, and the nervous system.

Wrongs of the Stomach.—Irritability of the stomach is seen in nearly every severe case of bilious fever, and is recognized by the elongated tongue, which is also pointed and reddened at tip and edges, and by tenderness over the epigastrium. There is nausea, with retching, and neither food, drink, nor medicine is retained with comfort, if at all. Our remedies are not readily absorbed, and if quinia is given, it only adds to the general irritability of the stomach and nervous system.

With this condition we administer,—

℞ Aconite.....gtt. v.
Ipecac.....gtt. x.
Water℥iv. M.

Sig. Teaspoonful every thirty or forty minutes until relief is obtained.

Where the patient is very nervous, and is startled at the slightest provocation, rhus tox. replaces the specific ipecac. A cold pack to the abdomen materially assists the internal medication. If the fever be very high, the wet-sheet pack or frequent sponging of the body will prove very beneficial.

Atony.—A broad, pallid tongue, with a nasty, dirty coating, pitting where the teeth come in contact, tells of atony and more

or less sepsis. With this condition, absorption of remedies and food is as impossible as in the opposite condition of irritability. Here the alkalies will be indicated.

If the coating on the tongue be white but not offensive, sodium bicarbonate, a saturated solution, should be given every hour. If the tongue has a nasty, dirty, moist coating, sodium sulphite is very much the better agent, given in the same way; viz., a saturated solution, every one, two, or three hours.

Where the tongue is not coated, but is full, and the tissues look congested and sluggish, echinacea will be the remedy, while the acids will be given where the tongue is dry and the mucous membranes are red, turning to brown as the disease advances.

Irritability of the Nervous System.—This is seen in the flushed face, bright eyes, and contracted pupils. The patient is restless, does not sleep well, which aggravates the disease and uses up the patient's vitality. This is always attended by high fever. The wet-sheet pack, full doses of veratrum and gelsemium will reduce the force of the fever, and, as the tongue becomes moist, administer five to ten grains of King's diaphoretic powder every five or six hours, as the case may need, and the patient will drop into a quiet sleep, that is sure to be followed by improvement.

Where there is great excitation of the cerebro-spinal centers, as shown by the sharp stroke of the pulse, the sudden starting of the patient, aconite and rhus tox. aa gtt̄s x, to water ℥iv, teaspoonful every hour, answers much better than veratrum and gelsemium.

If there be marked congestion, as shown by the dull, dilated pupil and tendency on the part of the patient to doze; if the pulse be oppressed, the tissues full, and the drowsiness passing to stupor, give

℞ Belladonna.....gtt. x to xv.
 Water℥iv. M.
 Sig. A teaspoonful every hour.

This will be followed by good results. As these various complications are overcome, the disease assumes its remittent form and quinine is again administered. Should there be complications of the respiratory tract, such as pneumonia, bronchitis, and kindred lesions, the treatment should be such as given under their respective heads. The same may be said of any other compli-

cation that may arise. We meet the condition by appropriate remedies. During convalescence a proper selection of food will be important, and a tonic nux vomica and hydrastine will improve the power of the stomach for digestion.

Pernicious Remittent Fever.—This type so closely resembles the pernicious intermittent fevers, that a separate description is unnecessary.

YELLOW FEVER.

Synonyms.—Yellow Jack; Black Vomit; Febris Flava.

Definition.—An acute, infectious, though non-contagious disease of the tropics or sub-tropics, but which may be conveyed to all countries, characterized by a sudden invasion, a high grade of fever lasting from two to seven days, marked tenderness over the epigastrium, vomiting of black, broken-down blood, albuminous urine, and yellow discoloration of the skin.

History.—Like cholera, yellow fever is more interesting from a historical point of view than from any other; for, happily, it has in all probability made its last severe visitation to the United States. Being a filth disease, it remains largely for the officials of any country to say whether or not the conditions shall exist whereby the disease shall gain a foothold. The happy results following the greatly improved sanitary condition of Havana, since the temporary rule of the United States in Cuba, will demonstrate to our neighbors the necessity of continuing the good work done in keeping the city clean; and since Puerto Rico is now our own possession, we will see that the sanitation of her cities is such that the disease will never gain a foothold there. These precautions, together with a rigid quarantine, should go far toward stamping out the plague in America.

The disease, in all probability, has existed for many centuries, although the first authentic report is that of the epidemic which appeared in the Barbadoes, West Indies, in 1647. It made its appearance into this country at Boston in 1693. Since then numerous epidemics have occurred.

The responsibility for the epidemic in New Orleans in 1905 rests, most likely, upon the Board of Health of that city, for had the same amount of money been expended in securing better sanitary quarters for her Italian tenants, that has been expended in the fight against the fever, in all probability the disease would

never have found a foothold. The water tanks of the old Creole houses were left uncovered, and the ancient Spanish houses, unsanitary caves of filth and vermin, were given over to Italian laborers, and the old slave quarters were converted into tenements. Into these quarters, reeking with filth and vermin, laborers were herded like cattle, in one instance, according to report, *twenty-eight* persons were found living in two rooms. New Orleans has learned, by a sad and expensive experience, that eternal vigilance is the price she must pay to insure her immunity in the future. During the summer and fall of 1905 there were 3,195 cases, 410 deaths.

The West Indies, some parts of the Mediterranean Coast, South America, and Africa are seats where the disease occurs endemically and epidemically. Guitéras has classified the infected areas as follows:

1. The focal zone, in which the disease is never absent, including Havana, Santiago, Vera Cruz, and other Spanish American ports.
2. Perifocal zones, or regions of periodic epidemics, including the ports of the tropical Atlantic in America and Africa.
3. The zone of accidental epidemics, between the parallels of forty-five north and thirty-five south latitude.

Dr. W. L. Coleman, of Houston, Texas, brings forth data to prove that yellow fever was first produced by the decomposition of animal excreta from the negro slaves.

Etiology.—The predisposing causes are:

First. Season; the disease always occurring during the heat of summer and early fall, and subsiding with the first severe frosts.

Second. Age; children are the most susceptible, though very young infants are usually exempt.

Third. Race; whites are far more susceptible than the negro, though no race is exempt. Males, from greater exposure, contract the disease more frequently than females. At one time it was thought that Creoles were immune, but this has been disproved.

Fourth. Unsanitary conditions; filth, heat, humidity, darkness, and foul air are conditions that favor the rapid multiplication of the poison, and the disease always rages with the most violent force in the thickly populated portions of a city, where the sanitary measures are criminally neglected. Intemperance, fear, and

overexhaustion predispose to the disease. The point of entrance is the digestive and respiratory tracts.

Exciting Cause.—The bacillus *icteroides* of Sanarelli and the bacillus x of Surgeon General Sternburg are similar, if not identical, and are now generally believed to be the specific cause of yellow fever. Experiments are now being made which would indicate that the mosquito is the carrier of the infection, suggesting to the authorities the thorough drainage of cities and an insistence upon the general use of netting.

Pathology.—The skin and mucous membrane show a varying degree of jaundice, from the light yellow to a dark brownish or orange color, the color deepening over the course of the blood-vessels. The liver partakes of the same yellowish color, and at first is hyperemic, though, after death, it is usually anemic. There may be extravasation of blood, giving it a mottled appearance. The parenchymatus changes show fatty or granular degeneration. The gastro-intestinal mucous membrane shows catarrhal lesions with softening of the membrane, at first hyperemic, followed by extravasation of blood.

The stomach contains more or less of broken-down blood, the so-called black vomit. The kidneys undergo diffuse nephritis, with fatty or granular degeneration. The spleen, though dark, soft, and friable, is but little changed in size. The heart is pale, flabby, and shows the same necrotic changes which take place in the other viscera.

The blood is dark and broken down, the disintegration of the red blood disks is responsible for the hemoglobin found in the blood serum. The meninges and brain are hyperemic, and show the characteristic degenerations.

Symptoms.—*Incubation.*—This varies from twenty-four hours to two weeks with the usual prodromal symptoms; viz., languor, listlessness, loss of appetite, partial arrest of secretions, with pain in head and back.

Invasion.—The invasion is abrupt; the chill, though not long, is well defined, and followed by febrile reaction, the temperature rapidly reaching 103°, 104°, or 105°; the skin becomes hot, dry, and harsh; the urinary secretion is arrested, and the bowels are obstinately constipated. The patient suffers severely with pain in the back, limbs, and head, and is extremely restless and uneasy.

Much irritation of the stomach exists from the first, with pain and sense of oppression in the epigastrium; in a majority of cases vomiting speedily comes on, and continues through this stage, the retching and ejection from the stomach being painful and difficult.

The eyes are generally suffused, reddened, and very sensitive to light, presenting the appearance that would follow exposure to wood-smoke; this has been looked upon as almost a pathognomonic symptom by some.

The pulse varies greatly in different cases; in many it is hard, quick, and irregular; in others small, corded, and oppressed; and, again, not different from what it would be in a simple remittent. The tongue hardly ever presents the same appearance; sometimes clean, again broad, flabby, and covered with a thin white coat; or reddened at tip and edges, pointed and coated in the center; and again presenting a thick, yellowish, or yellowish-brown coat. As before remarked, this stage varies in duration, and there is just as much variation in its intensity.

Stage of Remission.—The febrile action gradually abates; the vomiting ceases, or is less constant; the pains are much ameliorated; the skin becomes softened, and frequently covered with perspiration. The patient feels comparatively well, though exceedingly debilitated, and has hopes of speedy recovery; and yet, even now, may be noticed that yellowish discoloration, manifesting itself in the conjunctiva and the skin of the forehead and breast, the precursor of that third stage from which it is so difficult to recover.

This remission, sometimes so complete, can hardly be noticed at others, but the first rapidly passes into the third stage, or collapse. It is always of short duration, not more than from two to ten hours.

Third Stage.—In this stage the pulse becomes very feeble, and the prostration is excessive; the yellow appearance of the skin, which gives the disease its name, becomes plainly visible, and continues to deepen as the disease advances. The irritability of the stomach is excessive; nothing can be retained, but the vomiting now is easy. The material ejected from the stomach is peculiar, being very dark colored, and hence known by the name of black vomit. This dark-colored material has been determined to be broken-down blood.

Diarrhea frequently ensues, the discharges from the bowels

resembling those ejected from the stomach. The respiration is hurried and difficult, with frequent sighing, and the patient complains of an intolerable oppression and distress at the precordia.

The powers of life rapidly fail; slow delirium or coma comes on, and death soon eases the patient from his intense suffering. During this stage there is very little, if any, urine secreted, and it is highly albuminous. In some cases febrile reaction occurs during this stage, and in favorable cases terminates by lysis, or assumes a typhoid type, which rapidly proves fatal.

Diagnosis.—According to the statements of all authorities, it is extremely difficult, if not impossible, to distinguish yellow fever from the severer forms of remittent fever, in the first stage. Yet the prevalence of the disease as an epidemic in that locality is considered sufficient cause to adopt a treatment suitable for its arrest, in every case presenting the symptoms named.

The subsidence of the fever, after the exacerbation has continued more than twenty-four hours, is a prominent symptom of the disease; the commencing yellow discoloration of the skin, great prostration, and finally vomiting of dark-colored material, renders the diagnosis beyond cavil.

Prognosis.—We are always to bear in mind that yellow fever is one of the gravest of diseases; yet the prognosis varies, depending upon the character of the epidemic and the stage in which treatment is begun. In some epidemics the toxemia is intense and the mortality reaches an alarming per cent, while at other times all the cases seem more or less mild, the mortality dropping as low as five per cent.

Treatment.—*Prophylaxis.*—Quarantine must be rigidly enforced in individual cases as well as in the infected districts. The excreta should be thoroughly disinfected and buried; all clothing and bedding of a fever patient should be either disinfected or burned. When possible, those not immune should leave the infected area at the earliest moment, seeking a cooler place in a higher altitude. During an epidemic excesses of all kinds should be studiously avoided.

The medicinal treatment for yellow fever has largely been a failure, and physicians with little or no experience have been about as successful as those who have passed through the various epidemics; hence it is not presumptuous for one who has never seen a single case to outline a course of treatment.

Remembering that the blood is very early influenced by the toxin, causing its disintegration, we would suggest the remedies which would antidote or check this destruction,—antiseptics, such as baptisia and echinacea, in full doses, would most likely influence this process. The first-named remedy has been used extensively by our Southern physicians for this purpose.

Realizing that just in proportion as we control the fever will we retard the necrotic processes, the wet-sheet pack or spirit vapor bath would be among our best auxiliary measures to produce sedation. Internally, aconite or veratrum in the small dose would assist the above measures. Where there is great nervous irritability, with flushed face, bright eyes, and contracted pupils, gelsemium would likely prove of benefit. For gastric irritation, ipecac and rhus tox. would most likely be useful agents; for depression, camphor has been used successfully; for the stage of collapse, the treatment would be similar to the same stage in cholera; viz., hypodermic injections of strychnia and large injections, sub-cutaneously, of warm saline solution.

In the earlier stages, the bowels should be emptied by large enemas of warm water. For the intense thirst, acidulated waters would do no harm, and might afford some relief. During convalescence great care should be taken not to give anything but the blandest kind of diet, such as sherry whey, koumiss, malted milk, clam and chicken broths, etc.

CHOLERA.

Synonyms.—Cholera Algida; Cholera Asiatica; Cholera Maligna.

Definition.—Cholera is an acute, specific, infectious disease, occurring endemically and epidemically, and characterized by severe vomiting and copious watery stools, violent cramping of the muscles, and collapse.

Cholérine is a term which has come into use in recent years, and is applied to mild cases of cholera and the fatal cases of diarrhea attending an epidemic of cholera.

History.—On the right bank of the Ganges, one thousand feet above the sea-level, at the foot of the Himalaya Mountains, beautifully situated, lies the little town of Hurdwar. Here every year

more than one hundred thousand people come to bathe in the sacred waters of the Ganges, while every twelfth year, a sacred year, two million devotees make the pilgrimage.

During the yearly visits thousands of sheep and cattle are slaughtered for ceremonial rites, and the waste portions rot in the burning sun to become centers for the propagation of infectious diseases. This little city of five thousand people is the home and great focus from which cholera radiates throughout India. Mecca and Medina, other holy cities, are also the places of vast pilgrimages, and one can readily understand why cholera is endemic in India, where sanitation is unknown.

For centuries cholera has occurred in epidemic form in India, Persia, Egypt, and those provinces of Russia bordering the Black Sea. As the Eastern countries were opened to intercourse with European nations, avenues of communication were offered for the transmission of this dread disease, and in 1832 cholera made its first appearance in Europe, one hundred thousand dying in France alone. During this year it was brought by emigrant ships to Quebec, where it rapidly spread along the lines of travel up the great lakes, until it reached the Upper Mississippi.

During this same year it entered the United States by the way of New York, where over three thousand died. It traveled along the great thoroughfares, leaving death in its wake. In 1849 another epidemic occurred, this time entering by way of New Orleans, and, as before, visiting the larger cities, carrying off its victims by the thousands. In 1854 it again appeared in New York, though the loss of life was not so great as in 1849. In 1866 and 1867 it also visited America, but was more mild, and there were less fatalities than in any previous epidemic. In 1873 it made its last appearance in the United States, but owing to greatly improved sanitation it did not prevail over a wide field.

Cholera is of more interest to the American from a historical standpoint than from a practical one; for, in all probability, the United States has seen its last epidemic, for the quarantine system becomes more rigorous each year, so that the fatal disease will hardly be able to find entrance into our country.

Etiology.—Predisposing causes are such as lower the vitality and resisting power of the body; viz., overwork and lack of proper nourishment, enfeebled condition of the system from previous diseases, dissipation and poor food, especially food where decomposition has already begun, as in tainted meat and vegetables.

Season also influences the spread of the disease. In hot, moist weather the conditions are all favorable for the rapid development of the infectious poison; hence it reaches its maximum intensity at this time, while with the appearance of cold weather it entirely disappears. Social position is also a factor in predisposing to cholera; for this is essentially a filth disease, and consequently occurs more frequently among the poorer and more ignorant classes. During an epidemic the disease rages most fatally in the slums, where filth abounds, and is not so severe in the cleaner sections of the city.

The exciting cause is now generally recognized as the comma bacillus of Koch, which is not found in any other disease. This is about one-half the length of the tubercle bacillus, thicker and slightly curved, resembling a comma, hence the name. Some of them are corkscrew-like in shape, resembling the letter s. In fact it is not a true bacillus, but should be classed as a spirocheta.

They can be readily cultivated in various media, but desiccation destroys their vitality, differing greatly from the tubercle bacillus. They are found in the intestine very early in the disease, in the dejecta, and, when the rice-water discharges appear, are to be found in enormous quantities. They are rarely found in the vomitus, but may be found in large quantities in the intestines, post mortem.

In those cases which die within twenty-four or forty-eight hours from the attack, the bacilli are not found in the walls of the intestine; but where the disease is more protracted they invade the glands and deeper tissues. During an epidemic they are found often in the stools of well persons, such being immune owing to their vigorous health and resisting power. Koch, failing to find the spirilla in any of the internal organs, concluded that the systematic infection was due to ptomanis or toxins generated from the spirilla, since dead cultures are always toxic.

The infection is usually introduced into the system through the medium of water, either directly by drinking, or from food which has been washed in infected water or has been diluted with the same. It does not enter by inhalation, since drying destroys their vitality. It may, however, be conveyed by meat or bread on which the germs live for from six to eight days. They may also be conveyed to the mouth by the hands of those who wash the linen of cholera patients.

The virulence of an epidemic, then, depends upon the degree of contamination of the water supply. The Hamburg epidemic of 1892 is a striking example of this fact. The water supply was taken unfiltered from the Elbe; the mortality in the epidemic that prevailed was forty-two and two-tenths per cent, while the filtered water supplied from the same stream to a neighboring city resulted in a very low death rate. The safeguard of a city, then, lies largely in a pure water supply, and even this should be filtered.

Pathology.—The tissues after death are shrunken and drawn, and the extremities are inclined to be mottled; in some cases there is a post-mortem rise in temperature. Rigor mortis sets in very early. Spasmodic contractions sometimes occur for some moments after death; hence the eyes and jaws have been seen to move after life was extinct. Owing to this marked contraction, the limbs have been distorted and the partial turning of the body is thus accounted for, and is not, as many have supposed, the result of being buried alive.

The tissues are dry, having been drained of their fluids before death; hence some time elapses before decomposition begins after death.

The chief visceral lesion is that of the intestinal canal. The mucous membrane is swollen, hyperemic, and softened. The solitary glands and Peyer's patches are congested and sometimes ulcerated. The peritoneum is either dry or covered with a viscid, sticky fluid. The intestine contains a more or less quantity of rice-water, fluid rich in the comma bacillus. The denuding of the peritoneum is now supposed to be due to post-mortem changes. The kidneys and liver show cloudy swelling, and occasionally degeneration; the spleen, however, is generally found to be reduced in size. The heart is flabby, dry, and anemic-looking, while the blood is very dark, but slightly coagulable and robbed of its salts and fluids.

Symptoms.—The disease may be divided into three stages: (1) A choleraic diarrhea; (2) Cold stage, or stage of asphyxia or collapse; (3) Stage of reaction. Dr. Scudder, having passed through the epidemic of 1866-67, graphically describes cholera in the following words:

"Incubation. — Diarrheal Stage.—The stage of incubation varies greatly in length, from but a few hours to days. It may be

attended from the first with diarrhea, or it may precede this for some time. In the latter case, the patient will complain of a feeling of prostration, with relaxed skin, scanty urine, or urine of low specific gravity, a pallid tongue with a pasty white fur at its center; the pulse is invariably smaller, and increased in frequency; the appetite is poor, and the digestion imperfect, with occasionally a sensation of weight and uneasiness in the bowels. I have seen symptoms continue for from two to eight days before a choleraic diarrhea appeared, and I do not know that I have ever witnessed these symptoms where cholera did not fully develop itself, unless appropriate treatment was adopted.

"During an epidemic of cholera, diarrheas are very prevalent; and though it must be admitted that any form of gastro-intestinal irritation or disease predisposes to an attack, yet these are not to be regarded as choleraic. To place the matter in a different light, any diarrhea may become choleraic, but only by those persons being influenced by the peculiar epidemic poison.

"It is of importance, then, that we be able to distinguish between an ordinary and a choleraic diarrhea; for the first will require but the ordinary treatment (though it should always be arrested), while the second requires rest in the recumbent position, and a very careful treatment by specific remedies. We need not mention the symptoms of the ordinary diarrhea; it will be sufficient to specify those peculiar to the diarrhea of cholera.

"With the first choleraic discharge, the patient will feel unnatural prostration that is characteristic. It is not fear, or a nervous sensation, but a real exhaustion and loss of strength. An examination of the pulse will show an enfeebled circulation; the pulse being markedly small, easily compressed, and increased in frequency. The tongue will present a pallid appearance, with a white or pasty-white coat in its center. These symptoms are, as I believe, pathognomonic, and may be relied upon, whatever may be the character of the discharges. And I have seen them well marked, when there was but the inclination to go to stool, and where death resulted from cholera asphyxia within twenty-four hours.

"The discharges at first were fecal, though usually thin; as they continue they gradually lose color (dirty water) until at last they present the characteristic rice-water appearance.

"The duration of this choleraic diarrhea varies in different

cases; rarely of two or three days continuance, frequently not more than six to eight discharges in less than as many hours. It is observed that the prostration increases with each discharge, and the pulse is more affected; the amount discharged by the stool, as a general rule, determining the extent of the prostration, and the development of the second stage.

"Thirst is a marked feature of cholera, developing in the first stage, and increasing as the disease progresses, until it becomes one of the most intolerable features of the disease. In the second stage, whatever the patient may take as a drink is immediately rejected.

"Cholera asphyxia is ushered in by increased frequency in the discharges, which have ceased to be feculent, and, in a majority of cases, are characteristic,—rice-water. Great prostration attends them, and the pulse becomes very small and feeble.

"As a general rule, nausea is developed with the choleraic diarrhea, and with the development of the second stage vomiting is frequent and persistent. The vomiting, as well as the diarrhea, persists until the stage of collapse, when it ceases of its own accord.

"The surface now presents a peculiar appearance; the first tissues are shrunken, and the skin covering the extremities is contracted and shriveled, and of a bluish, leaden color. The extremities are also cold, and as the disease progresses it extends upward to the trunk. There is a want of elasticity in the skin; when pinched up it does not readily assume its position. As the disease progresses, the loss of tonicity is indicated by a free but unnatural clammy perspiration, sometimes as sticky and of the consistence of glue water.

"A very marked feature of this stage of cholera is the spasmodic contraction of the muscles, known as cramps. These usually make their appearance in the second stage, and, increasing in severity as the disease progresses, continue to the period of collapse. Sometimes they do not cease until death is far advanced. They commence in the muscles of the legs and thighs, in which they are most severe. Sometimes they extend upward and involve the psoas and the muscles of the abdomen, and occasionally the muscles of the upper extremities and back. In one case I witnessed, these cramps assumed the form of true tetanic spasms, involving all the voluntary muscles.

"The last part of the second stage has been known as the stage of collapse. The pulse has now left the wrist. The extremities are cold to the trunk, and the skin presents the peculiar purplish, shriveled appearance heretofore named. The features are shrunken and pinched, the eyes set back in the head, the lips livid, the ears and nose itching, the forehead cold and clammy, respiration difficult and irregular, the cutaneous veins distended and dark, and the mind evidently clouded and not appreciating the condition. Even with such symptoms, life may be prolonged for several hours, the patient finally dying from asphyxia.

"It will be noticed as characteristic of cholera, that no urine is passed in the second stage of the disease; indeed, none is secreted, and the bladder is usually found empty on post-mortem examination.

"Stage of Reaction.—The pulse comes back to the wrist, the surface becomes warm, the patient breathes with more ease, and is inclined to sleep. As we have noticed above, it may not go further than this. When it does, we will find the skin becoming dry and harsh; the pulse increased in frequency to 100° or even 120°; the mouth is dry, and the coating of the tongue assumes a shade of brown, with brownish sordes on the teeth. The urine is scanty and very highly colored, if passed at all. As a general rule, there is marked irritation of the nervous system, the patient being restless and irritable, and unable to sleep.

"These symptoms may give way in a few hours, secretion being established, and the patient convalescing without trouble. Or they may continue for several days, presenting the features of the nervous stage of a typhus fever. Or, increasing, the disease may run rapidly to a fatal termination."

Complications.—*Cholera Typhoid.*—Following reaction, there may be relapse, the patient becoming delirious, the tongue dry and brown, sordes appear on the teeth and lips, and the patient passes into a comatose condition, which finally ends in death.

Kidneys.—Various kidney lesions have followed convalescence, and death from uremic poisoning is not an uncommon result of this complication.

Cholérine.—There are cases where the diarrhea is attended with severe griping pains, vomiting, liquid copious stools, in which there is some fecal matter, and finally a slight collapse, followed

by reaction and return to health; this, in recent years, has been termed cholérine.

Diagnosis.—In the early stages, before the epidemic is fully established, there may be some confusion between this and cholera morbus, cholera nostras. Later the diagnosis is readily made, the symptoms being so marked as to be readily recognized. The rapid prostration, following the copious rice-water discharges, the vomiting and finally collapse, the patient becoming cold, blue, and almost pulseless, can not readily be mistaken.

Prognosis.—Like all infectious diseases, epidemics vary in intensity in different seasons and in different places. However, cholera is always a grave disease, and our prognosis should therefore be guarded. The mortality is always great among the aged and young children, among the intemperate and those poorly nourished, and where treatment is not vigorous in the early stage of the disease. We may say that the mortality varies from twenty to eighty per cent.

Treatment.—*Prophylaxis.*—Since cholera thrives where filth abounds, strict hygienic measures should be adopted to prevent further spread of the disease. Cleanliness should be the message communicated to every ear. Cess-pools, vaults, drains, catch-basins, etc., should be thoroughly cleaned and as thoroughly disinfected.

A vigorous quarantine should be established, and the excreta from a cholera patient, as well as the clothing and room, should be thoroughly disinfected. Regular habits should be insisted upon; for intemperance, overwork, and all influences which tend to depress the nervous system, predispose to cholera. Overeating should be discouraged, though the ordinary diet need not be changed; fresh vegetables and fruits should be encouraged, but, above and beyond all, is cleanliness and a pure water supply.

Medical Treatment.—Never having passed through an epidemic of cholera, I submit the treatment as practiced by Eclectics as given in Dr. Scudder's last edition of his work on practice, and also add the treatment recommended by Cantani, of Naples. The latter treatment, as you will see, was anticipated by Dr. Scudder; but no opportunity offered for trial after his attention had been directed to this line of treatment. We may therefore lay some claim to this new method.

Dr. Scudder says: "The treatment for the forming stage of the disease, diarrhea not being developed, will vary in different cases. When the circulation is feeble, and the skin relaxed, I prefer aconite with ipecacuanha in the usual doses, alternated with tincture of nux vomica in the proportion of ten gtts. to four ounces of water, a teaspoonful every two or three hours.

"If the tongue is pallid, and coated with a pasty-white coat, the sulphite of sodium may be given in doses of ten grains every two hours, or, in place of this, the bicarbonate of sodium, or common salt, may be used; but if the tongue is red, somewhat dusky, or there is a tinge of brown in the coating, the mineral acids will be preferable.

"A choleraic diarrhea requires to be promptly arrested. The patient should assume the recumbent position, and keep entirely quiet until the diarrhea is arrested, and the sense of prostration has passed away. This is imperative. The local application to the abdomen may be either a large sinapism or a cold pack, as the physician may prefer, or, in many, commence with the first, and then follow with the cold application.

"The remedies will vary in different cases, and with different practitioners. There is a very large list to select from, and we may employ the different classes of stimulants, astringents, narcotics, or special remedies.

"Among the first we have the essential oils, all of which have been employed, in the form of a compound tincture, in cholera. The compound tincture of cajeput is preferred by our school, and is probably as good as any combination that can be made. Whatever stimulant is selected, it is freely used, and continued until the diarrhea is arrested. In some cases it is combined with an astringent; in others, with a preparation of opium.

"Chloroform has been employed in this disease with advantage, in doses of from ten to forty drops. Chlorodyne has also been extensively used, and is probably as good a remedy as can be placed in the family. Camphor has been thought by some to be a specific; the tincture is given in doses of from ten to fifteen drops.

"The majority of the vegetable astringents have been employed to arrest the diarrhea of cholera. Some combine them with stimulants, others with narcotics; but the results have not been very flattering.

"Opium has been extensively employed for this purpose, and sometimes with excellent results. A pill of opium and camphor, half grain to one grain each, will probably be the best form of the remedy, and may be given as often as every hour. It has been recommended to add one grain of leptandrin to each dose, though I doubt the advantage of it. I have never used opium by mouth, in cholera, preferring its action by hypodermic injection of morphia.

"Of the many remedies I have employed for this diarrhea, nothing has given so much satisfaction as strychnia. I prescribe it in the following form:

"℞ Strychnia.....grs. $\frac{1}{2}$ to gr. 1.
 "Sub-Nitrate of Bismuth.....ʒi. M.
 "Sig. Divide in fifteen powders, and give one every half-hour or hour, until the feeling of prostration is removed, and the diarrhea checked.

"When the stomach is very sensitive to medicine, or there is a tendency to nausea and vomiting, we will have to employ remedies by mouth with great care. Indeed, in these cases I would never run any risks of exciting vomiting, preferring that the diarrhea should continue until it could be arrested by other means. I have had excellent success in these cases by administering salt water in moderate quantities, and the use of opium with a stimulant as an enema. The form that I prefer for the last is—

"℞ Tincture of Opium.....ʒss.
 "Tincture of Xanthoxylum.....ʒss. M.

"In place of the salt water, when it is distasteful, especially when the mucous membranes were reddened, I here use the *white liquid physic, in doses of a teaspoonful every fifteen to thirty minutes, until the patient is relieved. Afterwards, less frequently. The tincture of nux vomica may also be employed in this case with advantage, using it in small doses, frequently repeated.

"In the treatment of *cholera asphyxia*, the first object is evidently the relief of gastric irritation; for so long as nausea and

• "℞ Sodium Sulphate.....ʒviii.
 WaterOjss.
 Nitric and Muriatic Acids.....aa ʒi. M.

vomiting continue, no other remedies can be of any use, as they will be ejected. For this purpose I employ cold salt-water packs over the abdomen, though some use the large sinapism in preference. The patient should be kept in a recumbent position, and not be allowed to get up to stool, a bed-pan or cloths being employed. Dry heat should be applied to the extremities to as great an extent as possible, the patient being covered with blankets. In some of the milder cases, stimulants or aromatics may be used to arrest the nausea. Thus, as we have already seen, the compound tincture of cajeput will stop the vomiting in cholera morbus, and, continued, will arrest the diarrhea. Some have depended upon the aromatic waters, but I do not think much of them.

"The remedies that I have employed to best advantage are the following: A teaspoonful of salt in a glass of water, and given in small quantities frequently, has served the best purpose. The white liquid physic has proven valuable in the class of cases heretofore named. The tincture of nux vomica, or a solution of strychnia, will also accomplish the object in many cases, and may be used alone or in combination with either of the other means.

"I do not attempt to give remedies for the arrest of the diarrhea so long as the vomiting continues, unless it is a stimulant which answers this purpose, or strychnia. I have found it better to use enemas for this purpose, the preparation of opium and xanthoxylum, heretofore named, being preferred.

"Soda in its various preparations stands first in the list of curative means, and we will generally employ common salt in preference to any other. Strychnia undoubtedly stands second in the list of remedies, being the most powerful stimulant and tonic we ever employ.

"Cramps of the muscles may be relieved by brisk rubbing, but this should always be done under cover. A local application of chloroform, or compound tincture of cajeput, to the affected part, will frequently give great relief. The simplest, as well as the most effectual plan, is to give the great toe a sudden twist with the hand.

"Let it be recollected that the patient *must* keep the recumbent position, *must not* get up to stool, and *must* be warmly covered in bed with the application of dry heat.

"Though the thirst is excessive, yet water can not be given

with safety. Even after the vomiting is checked, we will find that but a small portion of fluid will cause it to recur. Small portions of salt water, frequently repeated, is the best means of supplying fluid to the blood.

"I feel confident that the loss of fluids might be replaced to some extent by subcutaneous injection, and for this purpose had prepared a four-ounce hypodermic syringe, had cholera reappeared in 1867. It was tried to some extent in 1866, with good results. Absorption from the cellular tissue is very rapid, even in an advanced stage of cholera, and a weak solution of salt water would be readily taken up. It might be used at several points, and as much as eight to twelve ounces introduced in the course of an hour.

"The stage of *collapse* will be treated by the administration of salt water in such quantities as can be borne by the stomach, by the assiduous use of dry heat, and such stimulants as may be deemed applicable, and by the hypodermic use of strychnia in large doses. Other than these three means, I know of none that is likely to prove of any use. Persons will, in rare cases, recover from this stage without medicine, as I have seen in two instances.

"Convalescence must be managed with great care. Quiet in bed is the only course of safety. The desire for drink must be supplied gradually and in small quantity, whilst the food should be of the most bland description, and taken sparingly. I have generally put the patient upon the use of aconite in small doses, with belladonna if there was any tendency to congestion. If the tongue becomes dry, and the mucous membranes be dusky red, as is frequently the case in the third stage, we give the dilute muriatic acid.

"Small doses of strychnia may be continued internally, or in its stead we may give the tincture of *nux vomica*. Quinine, when needed, is best used in the form of inunction, or applied in solution in brandy, with brisk friction.

"In some cases, small portions of brandy may be given with the drink, to keep up the strength and aid convalescence. We are governed here by the same rules that governed its administration in fever. If the pulse increases in volume, with a better circulation of blood, better secretion, and better innervation, let it be continued; but if the influence is the reverse, let it be stopped."

Enteroclysis.—Professor Cantani, of Naples, used with great success, according to report, the following solution introduced high into the bowel:

℞ Boiled Water.....	O ii to iv.
Tannin.....	℥iiss to ℥iiss.
Laudanum.....	gtt. xxx to l.
Powdered Gum Arabic.....	℥i. M.

This solution should be introduced through a Langdon rectal tube, introduced as high as possible, and at a temperature of 105°. These injections should be used with the first appearance of diarrhea. The bowel should be thoroughly irrigated several times in twenty-four hours.

Hypodermoclysis.—This is the introduction into the system of a saline solution to counteract the loss by the copious dejections, the solution:

℞ Chloride of Sodium.....	℥iiss.
Sodium Carbonate.....	℥iiss.
Boiled Water.....	Oiv. M.

The region selected is the mammary or ileo-costal; a large canula furnished with a stopcock is attached to the hose of a fountain syringe, which is elevated sufficiently high for the force of gravity to force the fluid into the system. A fold of loose tissue is raised, and the needle introduced quite a distance, and the current turned on; in a few moments quite a large tumor is formed; with a turn of the stopcock the solution ceases flowing; gentle friction over the seat of the swelling will hasten absorption, when more can be introduced. A warm bath greatly facilitates the absorption of the solution. At the same time a hypodermic of strychnia should be given, and hot applications made to the feet and extremities, while brisk friction of the surface with dry mustard will favor the reaction. This part of the treatment is begun with the first symptom of asphyxia. From the response I have received in the cold stage of cholera morbus from the introduction of saline solution, I am satisfied that it will prove of benefit in cholera.

CEREBRO-SPINAL FEVER.

Synonyms.—Spotted Fever; Cerebro-Spinal Meningitis; Typhus Syncopalis; Malignant Purpuric Fever.

Definition.—An acute, infectious, although but slightly contagious disease, occurring sporadically, endemically, and epidemically, and characterized, anatomically, by hyperemia of the brain and spinal cord, and sometimes attended by a petechial eruption. Clinically, by excruciating pains in the head, back, and limbs, hyperesthesia often followed by anesthesia, contraction of the muscles of the nucha, and delirium of a varied character.

History.—Although it is possible that this disease prevailed before the present century, no authentic account was ever given till Vieusseux described an epidemic which occurred in Genoa, Italy, in the year 1805, and which he termed a malignant, although non-contagious, fever. In the first family attacked, two children died within twenty-four hours. In another, four died after an illness of less than a day; thirty-three dying during the epidemic, the victims living from twelve hours to five days.

The following year it crossed the Atlantic and appeared at Medfield, Massachusetts. From 1806 to 1816 the disease appeared in most of the New England States and in Canada. During this same period, 1805 to 1816, it visited France and Prussia.

From 1837 to 1849 France and Italy suffered more than any other countries, the armies bearing the brunt of the epidemic. The mortality was large. From 1854 to 1861 the Scandinavian peninsula was ravaged by the dread disease, more than forty-one hundred dying in Sweden during the seven years. From 1861 to 1868 Germany, Ireland, and the United States were the most afflicted.

While these are regarded as the four great epidemic periods, nearly every year since 1805 the disease has occurred at some point, the exception being from 1850 to 1854, when both hemispheres seemed spared. Since 1860 nearly every civilized country has been visited by this dread malady.

Although this disease was first regarded as occurring only epidemically—hence one of its names, epidemic cerebro-spinal meningitis—since 1860 it has assumed a new phase, becoming acclimatized, or, as Smith says, naturalized in the large cities, and from an epidemic disease it has gradually changed, becoming endemic in all our large cities. Such is true at least in New York, Philadelphia, Chicago, St. Louis, and Cincinnati. For several years, not a year has passed but cases have been reported in New York, Philadelphia, and Cincinnati. An examination of the reports, taken from the Health Department of our city, shows that

during the past sixteen years there has not been a break in its steady march, and, notwithstanding our boasted advance in medicine and sanitation, we begin the twentieth century with the deadly fever thoroughly intrenched and ever present.

Etiology.—As in many other diseases, the exciting cause has not yet been determined, although the meningococcus intracellularis of Weichselbaum is believed to be a factor in the disease. The peculiar fact that this disease occurs in isolated sections where there has been no connection with other cases, is one of the strongest proofs, to my mind, that it is not microbic in its origin. We can not believe in the spontaneous generation of life, and hence we must look elsewhere for the cause. That there is a toxin which is intense in character, there can be no doubt; but we are inclined to believe that it is generated in the body in the metabolic changes which so rapidly take place on great exertion.

Exertion.—One of the most prominent predisposing causes is overexertion, either physical or mental, and where the tissue changes are rapid, and where there is a failure in the excretory organs to remove the poisons, it must affect the fluids of the body for harm. Soldiers after severe and prolonged marches are especially susceptible, and we are often told by the parents that great mental worry or work in school preceded the attack.

Age.—Children and young adults are more frequently attacked than those of maturer age, although none are exempt except the very aged.

Climate.—The disease prevails largely in the north temperate zone, and is unknown in the tropics.

Overcrowding and Filth.—Dirt, especially human dirt, is a rich soil for the generation of poisons of various kinds and intensity; hence, in the poorer quarters, where but little attention is paid to cleanliness and ventilation, where filth accumulates and fairly reeks with the stench of its decomposition, we find the susceptibility very great.

Modes of Conveyance.—We do not understand the method by which the infectious material is carried from the sick to the well, as it is considered non-contagious, or, if contagious, to but a very slight extent, the best proof being that it very rarely attacks more than one member of a household. J. Louis Smith found single cases occurring in seventy families, dual cases in nine families, three cases in one family, and four cases in one

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other family; intercourse with the sick-room was not restricted in any of these cases, the children frequently assisting in the nursing.

Pathology.—In the cases which speedily prove fatal, there are but little, if any, changes in the blood and tissues, the only marked or characteristic lesion being the hyperemia of the meninges of the brain and cord. Where the disease has continued for several days, however, we find the characteristic suppurative exudation. The character of this material depends upon the degree of the inflammation; at first it is seroplastic, but later it changes to a purulent fluid.

The sinuses of the dura mater contain blood clots. The ventricles are filled with a serous or sero-purulent fluid. The pia mater, says Dr. Netter, is the seat of the characteristic lesion. "The exudation upon its surface presents different aspects; sometimes it is a yellowish, false membrane, resembling a layer of butter spread over the surface of the brain." The exudation sometimes follows the course of the auditory and optic nerves, pus having been found in the internal ear and chamber of the eye.

The lesions of the cord are similar in character; first congestion, followed by suppurative changes already noted. The septic character is seen in the various viscera, and tissues generally. The white corpuscles are largely increased in numbers in the blood. Reider reports a case where there were twenty thousand, one hundred cells to the cubic millimeter. The lesion of the pleura, lungs and bronchi are such as would be found as complications in any malignant disease.

The liver, spleen, and kidneys are usually slightly engorged and somewhat softened. The muscular tissues may undergo granular degeneration. There occurs in quite a number of cases a petechial eruption; the purpuric spots may be quite profuse, or but one or two may be seen; these, however, are not constant.

Symptoms.—The symptoms of this fever have a wide range, although some are characteristic and constant.

Incubation.—The period of incubation is not determined; it may last for a few hours or for several days, although most frequently the invasion is sudden. Where we have a forming stage, the prodromal symptoms are similar to those of all fevers, but more intensified, the headache being more severe and vertigo almost constant, the patient staggering when he attempts to walk.

Invasion.—The invasion is usually sudden, the patient having

but little warning. It is announced by a chill, accompanied by a pain in the head. There is often nausea and vomiting, and in children a convulsion is not rare.

The excruciating pain in the head is characteristic and one of the constant features during the disease, and while it may be lulled by coma or delirium, it recurs with the first ray of returning consciousness. "My head, my head!" is the familiar cry. The pain in the back is almost as great, especially in the cervical and lumbar regions. There is also general hyperesthesia, and the patient cries if touched or moved. The patient generally lies passive or immobile on this account, the least motion adding to his sufferings. Occasionally, however, a patient is restless and tosses about. There is contraction of the muscles of the nucha, and the head is drawn back. There is great sensitiveness to light and sound.

The fever is usually asthenic in character, the temperature range being low, and the extremities cold. In exceptional cases the temperature may reach 104° or 105° , the pulse being very rapid, but weak; or slow and feeble; again wiry and rapid. The breathing is usually increased in frequency.

Delirium is one of the most constant symptoms, and but few patients pass through all stages without it; the character of it varies, however. In some it will be wild and intense, the patient requiring two or more assistants to keep him in bed; this may be followed by coma. Again the delirium may be passive and of a low muttering character. Coma may come on early, within twenty-four or forty-eight hours, when it is an unfavorable symptom. Where the disease is of long duration, the symptoms are legion, the typhoid being the most prominent. A case under my care lasting ten weeks, assumed a different phase every few days.

A return to consciousness does not necessarily mean an improvement; for after one or more lucid days, he may again relapse into unconsciousness. In perhaps one-third of the cases a petechial eruption makes its appearance. At first it may be bright in color, but soon becomes of a dusky hue; it may be discrete or confluent. Vesicles upon the face—herpes facialis—is also quite common, although not constant.

The tongue, after a few days, becomes dry and shrunken, although it may be moist and dirty. After the first twenty-four or forty-eight hours the irritation of the stomach disappears, and the patient retains food and drink. There is usually constipation.

The special senses are greatly impaired, photophobia being often present, while loss of taste and hearing is quite common. The emaciation, where the disease runs a long course, is extreme.

One peculiar feature of this dread malady is, that, after having run a course of several weeks, all the symptoms give way, the force of the disease seems to have spent itself, the pulse and temperature become normal, the appetite is good, a sufficient amount of nourishment is taken, but the patient gradually fails, and finally dies of exhaustion, or, remaining in this weakened condition for days, the tide is finally turned in his favor and the patient slowly regains his health.

Paralysis may occur at any stage of the fever, although usually in the latter stage. This may be but temporary, as noticed in one of my cases, the paralysis, involving the entire right side, disappear in a few weeks. I have met with one symptom which I have not seen described; viz., a cadaveric odor, like that sometimes noticed a few hours before dissolution, and, although unfavorable, it is not necessarily fatal.

Convalescence may be followed by impairment of the hearing. Although the brain bears the brunt of the attack, the mental faculties, on recovery, are usually unimpaired.

Complications.—Pleurisy, pericarditis, and pneumonia are the most dreaded complications, and lessen the hope of recovery. They are recognized by their characteristic symptoms.

Diagnosis.—The diagnosis is comparatively easy. The suddenness of the attack; the extreme pain in the head; the contraction of the muscles of the nucha; the tenderness on pressure along the cervical region causing the patient to flinch, even although unconscious; the great pain in the cervical and lumbar regions; the active delirium; the eruption, when present; the irregular fever,—make a group of symptoms which can not be mistaken for those of any other disease.

Prognosis.—This is one of the gravest of diseases, and the prognosis must always be guarded. The character of the epidemic, the condition of the patient when attacked, the nature of the complication, if any, would influence the prognosis. If seen early, the prognosis is favorable in many cases.

Treatment.—As in other infectious diseases, where possible, the patient should be isolated in a large, airy room, where good

ventilation can be secured. The room should be darkened, and, as far as possible, everything which would tend to excitement avoided, and the patient kept perfectly quiet. The diet should consist of milk and broths, and be administered at regular intervals.

In the administration of remedies it is well to remember its twofold character,—the hyperemia of the brain and cord, and the intense sepsis. For the great irritation of the nerve centers, we will administer with our sedatives in full doses, gelsemium; if the pulse be small and quick,—

Aconite.—Where the pulse is small and frequent,—

℞ Aconitegtt. v.
Gelsemium.....gtt. x. to xxx.
Aqua Dest.....ʒiv. M.
Sig. A teaspoonful every hour.

If the pulse is full and strong and the delirium active,—

Veratrum.—Where the pulse is full and bounding,—

℞ Veratrumgtt. xx.
Gelsemiumʒss.
Aqua Dest.....ʒiv. M.
Sig. A teaspoonful every hour.

At the same time we would sponge the head with hot water, that being more soothing than the cold pack. The hot sponge bath may also be used along the spine with benefit. Dr. Webster speaks highly of jaborandi, which may be used in three or four drop doses.

℞ Jaborandiʒiiss.
Aqua Dest.....ʒiv. M.
Sig. A teaspoonful every hour.

Rhus.—*Rhus tox.* is an agent which is of excellent use where the patient starts in his sleep, where the pulse is quick, sharp, and wiry. If, in addition to the irritation of the cerebro-spinal centers, there is nausea and vomiting, it is doubly indicated.

Belladonna.—If the patient is dull and drowsy, coma early making its appearance, we would give,—

℞ Belladonna.....gtt. x.
Waterʒiv. M.
Sig. A teaspoonful every hour.

Sodium Sulphite.—Where the sepsis is shown by the broad, pallid, moist, dirty coating upon the tongue, sulphite of soda will be our remedy.

Chlorate of Potassium.—Where the odor is cadaveric, I have seen the tongue clear and the odor disappear within ten hours, on,—

℞ Potassium Chlorate.....3i.
 Phosphate of Hydrastine.....grs. x.
 Aqua Dest.....℥iv. M.
 Sig. A teaspoonful every hour.

Echinacea.—This is one of our best remedies in this disease. It is called for with the first appearance of sepsis. It may be given alone or in combination with the sedative:

℞ Echinacea3i.
 Aqua Dest.....℥iv. M.
 Sig. A teaspoonful every hour.

It may be given from the beginning to convalescence.

Hyoscyamus.—For the delirium, hyoscyamus is often useful; if of an active character, the remedy may be combined with stramonium, which makes it more effective. These remedies are similar in their effect, hyoscyamus being superior.

Passiflora.—From what we know of *passiflora* in quieting the nervous system in infants, especially where convulsions intervene, we would be inclined to try this agent. If given, it should be in quite large doses,—from a half to a teaspoonful of the tincture.

Convalescence.—Where the disease has run a long course, the vitality is very much reduced and the danger is from extreme exhaustion; hence the patient must be careful as to overexertion. The best tonic is good, nourishing food, which is easily digested.

VARIOLA.

Synonyms.—Small-pox; German, Blattern; French, La Petite Vérole.

Definition.—A specific, infectious, and highly contagious febrile disease, which, after a definite period of incubation, lasting from seven to fourteen days, commences abruptly with chilly sensations, accompanied by headache, an intense pain in the back,

especially in the sacral and lumbar regions, and characterized by a dermatitis, in which the eruption passes from papule to vesicle, and this in turn to pustule, finally desiccating, leaving small cicatrices, where the suppurative processes have extended to the deeper tissues of the skin.

With the appearance of the eruption, usually on the second or third day, there is a decline in the temperature, to be followed by a secondary fever during pustulation.

History.—The origin of small-pox is more or less a mystery, and three different countries are named as the original home of this loathsome and dreaded disease. Moore regards China as the original seat of the plague, and gives the earliest records as 1122 B. C. The disease is called Tien-hwa, meaning the "Heavenly Flower." It has been deified, and temples have been erected in honor of the goddess who bears the name of "Holy Mother of Small-pox." While there is great doubt as to the authenticity of these early records, it is well known that the disease has prevailed from a very remote period, inoculation having been practiced in China for more than a thousand years.

Hirsh regards India and Central Africa as the original habitats of the disease. The traditions of the Brahmin cast, from time immemorial, give India as the starting place. Here, as in China, temples are erected for the worship of a deity whose protection was invoked at the outbreak of an epidemic. The disease was unknown to the early Greeks and Romans, although some regarded the great plague of Athens, 430 to 425 B. C., as small-pox.

It appeared in Europe during the sixth century, devastating the shores of the Mediterranean. During the crusades it again invaded Europe. The fourteenth century found it in Ireland, and the following century in Germany.

Fifteen years after the discovery of America, small-pox visited the New World, and, in 1620, Mexico was the scene of one of the most dreadful epidemics in the history of this most loathsome plague. The United Colonies escaped until the seventeenth century, and Australia until the nineteenth century.

The mortality, previous to vaccination, was frightfully large, and when the disease entered a country for the first time it numbered its victims by the millions. Thus its first invasion of Mexico resulted in the death of three and a half millions of her people,

while in Iceland one-fourth of her population succumbed at the first outbreak, and a quarter of a century later Greenland was almost depopulated.

This disease, which at one time was the scourge of the world, has largely been shorn of its terrors, thanks to Jenner, one of the greatest benefactors of his century, and also to the modern sanitary and hygienic measures adopted during every outbreak of any contagious disease. Ever since Jenner's discovery there have been, at various times, attempts to discredit its prophylactic power, owing either to its occasional failure, or as the result of a death from vaccination or the transmission of other diseases.

That unpleasant and serious results have followed vaccination, none will deny; nevertheless, a prophylactic measure of such vast importance should not be discouraged because of faulty vaccine virus; rather should there be extra precautions that only pure, fresh virus be used. Could this be secured, and vaccination universally practiced, there can be but little doubt that Jenner's prophecy that small-pox would become extinct would be soon realized.

Etiology.—The contagion of small-pox is the most virulent of all the infectious diseases, and all persons who are unprotected by vaccination are almost certain to contract the disease when exposed, although there have been notable exceptions.

The true nature of the virus is unknown, and although certain micro-organisms have been described which are found in the pock, there is no proof that they are responsible for producing the poison. All that is positively known is, that it is developed in the system and reproduced in the pustule.

The virus exists in the secretions, and excretions from the skin, kidneys, and bowels. The crusts, or scabs, however, contain by far the most important factors in the dissemination of the poison, and the dust from this source impregnates the air, furniture, and clothing of the sick-room.

The virus possesses a tenacity exceeding that of all other contagious diseases, and may remain in a dormant stage for months or years, ready to break out afresh whenever the conditions are favorable for its propagation. Just how early the disease becomes contagious has not been definitely determined, although it is probably not until after the eruption makes its appearance. The poison of a mild case of varioloid is sufficient to produce a malignant

FIGURE 8. CONFLUENT SMALLPOX: EARLY PUSTULAR
STAGE.—(*Corlett.*)

type of small-pox in the unprotected; hence the wisdom of universal protection by vaccination.

Age.—No age is exempt, although the mortality is greatest among young children. The fetus has been attacked, and cases have been recorded where the child came into the world with the rash already developed, and still others bore the scars as a proof of having undergone the disease in utero.

Sex.—Sex carries with it no predisposing power, save the more frequent exposure of the male.

Race.—The colored race seems more susceptible to the contagion than the white race, and especially is this true of the negro. The mortality is also greater, although this may be accounted for more on sanitary grounds than on that of race. The aborigines have always suffered greatly in an outbreak, and the history of epidemics among the Indians of our own country reveals a mortality truly appalling.

Pathology.—The most marked pathological change occurs in the skin, due to the cellular infiltration during the inflammatory process. The eruption is the result of changes which take place in the rete mucosum, and consists of papilla, vesicle, pustule, and scab.

The hyperemia is first made apparent by small red spots which very soon assume the hard, shot-like characteristic papillæ, due to the increase of cells in the rete mucosum. As the inflammation progresses, molecular changes occur, the cells deliquescing, and a vesicle forming on the apex of the papilla. The vesicle consists of several small cups or pockets separated by fibrinous reticuli, and filled, at first, with a clear, whey-colored fluid composed of serum, leukocytes, and fibrin filaments.

The fibrous reticuli being firm, the center of the vesicle becomes depressed, while the circumference swells and becomes elevated; hence the cup-shaped or umbilicated vesicle, characteristic of small-pox. The blood-vessels throughout the cutis are now dilated, and a stream of leukocytes engorge the vesicle, the contents change to a yellowish or purulent character, and the pustule is formed.

The suppurative process softens and often breaks down the fibrous septum, and the pustule becomes conical. If the suppurative process extends to the cutis vera, cicatrization follows, and pitting necessarily results. The pustules may dry up, but usually

FIGURE 9. VARIOLA: CONFLUENT ON FACE, SEMICONFLUENT AND DISCRETE ON OTHER PARTS OF THE BODY. MUCOUS MEMBRANES OF MOUTH AND THROAT COVERED WITH WELL-FORMED PUSTULES—(Corlett.)

rupture, exuding their contents, which, drying, form the scabs or crusts. These consist of dried pus cells, and the detritus resulting from the previous destructive processes.

The mucous membrane of the nose, mouth, pharynx, esophagus, and rectum may be the seat of the eruption, and Peyer's glands may be swollen and infiltrated. Only when the mucous membrane is exposed to the external air, are fully developed pustules seen, while in the larynx bronchi and esophagus the tissue changes result in ulceration.

In the hemorrhagic form, extravasation takes place in the serous and mucous surfaces, while parenchymatous changes occur in the various viscera. Although there is no characteristic change in the lungs, hypostatic congestion and broncho-pneumonia are not uncommon.

Early we may have myocardial changes, and endocarditis and pericarditis have been associated with this disease. There may be diffuse hepatitis with swelling, although in the hemorrhagic form it is firm and hard. The spleen shows cloudy swelling, and there may be fatty degeneration. The kidneys may reveal a similar condition and nephritis may follow. The blood does not reveal any microscopic changes, although darkened in color.

Symptoms.—All writers agree as to the division of small-pox into three varieties, the symptoms varying according to the form presented.

1. *Variola Vera; Discrete; Confluent.*
2. *Variola Hemorrhagica; Purpura Variolosa; Hemorrhagica Pustulosa.*
3. *Varioloid.*

Variola Vera.—The disease may be described consecutively under the stages, incubation, invasion, eruption, maturation, and desquamation.

Incubation.—This stage embraces a period of from ten to fifteen days, extending from the time of exposure to the infection to the ushering in of the disease by the chill. The average duration is twelve days, although it may be prolonged to three weeks.

Prodromal symptoms are generally wanting, the period of invasion coming on suddenly; but when they are present they consist of malaise, and aching of the entire body. The tongue is furred, there is loss of appetite, more or less headache, with general soreness of the muscular tissues.

Invasion.—A chill, more or less pronounced, attended with nausea and sometimes vomiting, marks the stage of invasion in the adult, while a convulsion may be the symptom which first announces its presence in the child. The chill may consist of a hard rigor, or there may be chilly sensations alternated with flashes of heat, extending over a period of twenty-four hours. As reaction follows, the pain in the back, lumbar and sacral regions, becomes intense in character, while the face is flushed and the headache intolerable.

The temperature rises rapidly till it reaches 105° to 106° , or even higher, although in milder cases it will not go over 100° or 102° . The pulse is full and bounding, respiration short and hurried, while the bronchial cough, which so frequently accompanies the invasion, reveals the bronchial irritation. The tongue is coated with a moist, dirty, pasty coating, which is somewhat characteristic. The skin is often moist despite the high temperature. There may be soreness of the throat thus early in the disease, and auscultation reveals dry rales.

Examination of the left hypochondrium shows slight splenic enlargement. During this period there may be present an initial or accidental rash, erythematus in character, resembling scarlatina or measles, and making its appearance on the lower part of the abdomen and inner surface of the thighs and arms. If the physician is not on his guard, this may mislead him in his diagnosis.

The period of invasion lasts about three days, during which time the pain in head and back continues, the patient is very restless, and, in the severe form, delirium occurs.

Eruption.—By the third, or beginning of the fourth day, the eruption makes its appearance in the form of small red spots resembling flea-bites, first upon the forehead at the edge of the hair, then upon the face, neck, wrists, trunk, and lastly upon the extremities. The fever now begins to decline, and there is relief from the pain in the head and back. The small red spots soon become hard, and when the finger is passed over them it receives the sensation of feeling a shot beneath the skin. A burning sensation gives rise to a pruritis. These hard, shotty bodies are the papules, which by the sixth day show their apices to be filled with a clear, whey-like fluid.

As the process of evolution continues, the vesicles replace

the papules, and the center becomes depressed, giving them an umbilicated appearance. The vesicles are inclined to be grouped in threes and fives, although in the confluent form this peculiarity is not observed. As the eruption progresses, there is marked tumefaction at the base of the vesicle, and the parts become greatly swollen. The nose becomes distorted, the eyes are closed, and the patient is scarcely recognizable by his most intimate friends. The vesicle, after forty-eight hours, or on the eighth day of the eruption, changes its consistency, the contents become yellow, the center gives way, and the pustule is then fully developed.

Maturation.—The center now breaks down, and many of the pustules become conical in shape. The swelling that attends the development of the pustules in the nose and throat, renders both respiration and deglutition quite difficult, and the suffering of the patient is extreme. The pustules rupture, either spontaneously or as the result of injury—the itching being almost unbearable—and the contents exude as a gluey or syrupy substance. A disgusting, fetid odor now is emitted, and one is ready to class this as one of the most loathsome of all diseases.

During the maturation of the pustules, a secondary fever arises, and for forty-eight or seventy-two hours the temperature runs high, the pulse is rapid, the patient restless, and, in severe cases, delirium again appears, although usually the fever is much milder than in the early stage.

Desiccation.—Even before the eleventh day, many of the pustules break, and the sticky contents, drying, form the crusts or scabs, and the period of desiccation is begun. As this stage progresses, the swelling and pain subside, the redness disappears, the eyes open, the nostrils become clear, respiration is easy, and the patient experiences relief, after many days of suffering. The crusts soon separate and drop off, leaving a blue or purplish mottled appearance, and when the cutis vera has been invaded, a small pit or pock results. In the severer forms, the period of desiccation and separation extends over a period of several weeks, although it is usually complete by the twenty-first day.

Desquamation.—In addition to the separation of the crusts, there is often a branny desquamation, somewhat resembling that of scarlet fever, which continues for a week or ten days after the skin has become free of crusts.

Discrete.—In the discrete form the eruption appears later,

is not so profuse, and but few pustules, which are grouped, make their appearance. The fever does not run so high, the systemic disturbance is not so great, the secondary fever is mild and of short duration, and the period of desiccation is materially shortened.

Confluent.—This is just the opposite of the discrete. The eruption is seen earlier and is much more profuse, running together in the severe types. The fever is very active, and the systemic disturbance of a most serious nature. Maturation and desiccation are more prolonged, while the secondary fever is quite active. Suppuration is much greater, and the cutis vera is more often involved. Cicatrization and desquamation follow.

Hemorrhagic Small-pox.—This variety appears in two forms, *purpura variolosa*—the so-called black small-pox, in which the symptoms appear very early and death occurs in from forty-eight hours to six days before the pustules develop—and *variola hemorrhagica pustulosa*, in which the disease progresses as an ordinary small-pox till the development of the vesicle or pustule, when the hemorrhage takes place in these bodies. There may also be hemorrhage from the mucous membranes.

Purpura Variolosa.—The period of invasion is more intense in character than in the former varieties. By the second or third day a dingy hyperemic flush appears, and petechia is seen over a large portion of the body. "The skin may have a uniformly purplish hue, and the unfortunate victim may even look plum-colored." (Osler.)

In the most severe forms, death may result before the eruption appears. As the disease progresses, hemorrhages may occur from the mucous surfaces. The face becomes swollen, and ecchymosis occurs in the conjunctiva, giving the patient a most terrible appearance. Moore, of Dublin, says: "A condition of acute hemophilia is in fact produced, so that the ill-fated sufferer bleeds from every pore and orifice of the body. There is chemosis, blood being effused into the connective tissue binding the conjunctiva to the eyeball, sometimes to the point of bursting, so that the patient may even weep tears of blood. Retinal hemorrhage may destroy the eyesight.

There is epistaxis, terrible because uncontrollable. Blood oozes from the lips and gums. The patient spits or coughs up

blood; he vomits blood; the motions from the bowels are tarry. Blood pours from the kidneys, and in the female from the genital organs. The tongue looks as if it were parboiled, and there is unquenchable thirst. Fortunately, one rarely sees such desperate cases as these.

Another peculiar phase of this form is the retention of the mental faculties. In most intense lesions, nature kindly dulls the mind, and coma or delirium veils the present. Here, however, the mind remains clear, and the unfortunate victim looks death in the face almost to the last hour.

Variolosa Pustulosa Hemorrhagica.—In this form the disease does not begin in such a tempestuous form, but progresses as a severe case of small-pox till the vesicle or pustule forms, when there is extravasation of blood into the vesicle. The earlier the hemorrhage, the greater the danger. Of these two forms Moore says: "They differ merely in degree; in both, the blood is profoundly altered and devitalized to such an extent that it is apparently rendered incapable of throwing out or developing the characteristic or pathognomonic rash of variola. . . . The blood is so devitalized and defibrinated as to establish an acute hemophilia, the patient becoming 'bleeders' from an infectious dissolution of the blood."

Varioloid.—This is a mild form, which has been modified by vaccination. In some, this prophylactic measure is only partially protective, while in others, after a few years, it loses its protective value, and on exposure the individual contracts small-pox in a very much modified form. That it is genuine small-pox is proven by the contagion giving rise to the fully developed disease in a person who has not been vaccinated, and by affording perfect immunity from variola.

It differs from small-pox only in that the symptoms are milder and it runs a shorter course. The symptoms are those of a mild case of discrete small-pox. The eruption is scanty, in some cases only one or two pustules showing. There is but little fever, which subsides upon the appearance of the eruption. The period of maturation is generally but six or eight days, and the secondary fever, if any, is of short duration. The desiccation and removal of the crusts is also rapid, so that by the twelfth or fifteenth day the surface is well freed from them.

SMALL-POX.

Plate 7.

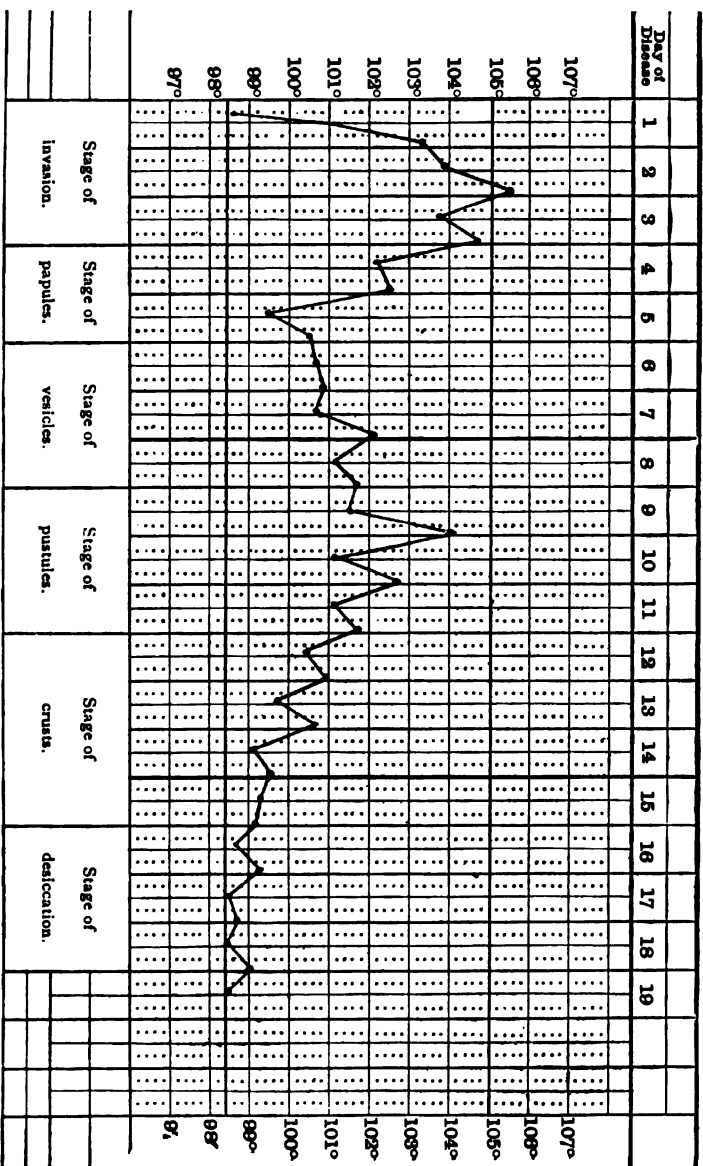


Chart of temperature curve of small-pox (Eichhorst.) (Lockwood.)

Complications.—The complications are generally inflammatory in character, the respiratory apparatus suffering most frequently.

Laryngitis, resulting in edema of the glottis, attended by dangerous symptoms of asphyxiation, is not uncommon.

Bronchitis.—This is one of the most frequent complications, and occurs early in the disease.

Pneumonia also frequently occurs, followed by an effusion into the pleural cavity.

Cardiac complications are more rare, although myocardial changes do sometimes take place. *Endocarditis* and *Pericarditis* are among the rare complications.

Nephritis occurs but seldom, although a temporary albuminuria is not uncommon. Boils and abscesses are among the common and painful sequences.

Catarrhal and Purulent Conjunctivitis may occur, although not so common as in former years, owing to the better care and more aseptic measures that are used.

Baldness may result from the destruction of the hair follicles.

Otitis Media occasionally results, leaving the patient with a disgusting fetid discharge from the ear.

Diagnosis.—If an epidemic is prevailing, with a history of exposure, there is but little difficulty in a diagnosis; but in this age of rapid transit, where a patient may be exposed one day and be a thousand miles away in twenty-four hours, it is often impossible to obtain a history of exposure, and we are to be guided by the more positive symptoms which are characteristic of the disease.

For the first few days there may be danger of mistaking this for measles, scarlet fever, or chicken-pox. The sudden onset of the disease, the great pain in the head and back, the high fever, and dirty, pasty tongue, are at once suggestive of small-pox, while the absence of catarrhal symptoms and the marked papular and shotty feeling of the eruption, excludes measles.

In scarlet fever there is merely the exanthematous redness and the deep scarlet redness of the throat. It is distinguished from varicella by the mildness of the symptoms of the latter, the irregular vesicle, together with an early maturation, which makes the diagnosis easy.

The hemorrhagic form may be diagnosed with difficulty when

the patient dies before the eruption appears, and one must be guided by the history and general symptoms. Where the epidemic is of a very mild character, like the one, that prevailed in Cincinnati in 1899-1900, where the patient had but little if any fever, and was not compelled to go to bed, the vesicles being small and insignificant, much doubt existed as to its true character, and, although it was denied by some, the Health Department regarded it as true small-pox and compelled its recognition.

Prognosis.—Although the mortality is far less than in former years, the prognosis will be determined by several conditions.

First, as to its form. The milder cases all recover; for example, in the epidemic of 1899 in this city, two hundred and fifty cases were reported and no deaths. In the confluent form, where there is early disorganization of the blood, or where there are serious complications, the prognosis must be guarded. The hemorrhagic form is also grave, and a certain per cent of cases will prove fatal.

Age and race will also figure in the prognosis, the disease being more fatal in the young and in the colored races. Taken as a whole, however, the prognosis is favorable, especially if diagnosed early and if modern methods are employed.

Treatment.—As soon as the diagnosis is made, the patient should at once be isolated and placed, when possible, in a large, airy room. All unnecessary furniture, drapery, and carpets should be removed and the room kept thoroughly ventilated. The impregnated air must be removed and fresh air take its place. While cleanliness is of great importance in any disease, it is doubly so in this. The bed clothing must be daily changed as well as that worn by the patient, and warm water and soap must be freely used, especially during the period of maturation.

As a disinfectant, Platt's chlorides can be freely used. It may be sprinkled on the bed, on the carpet, and some placed in shallow vessels around the bed; and where the odor is especially disagreeable, the room may be sprayed with the solution.

Veratrum.—We begin the treatment by the use of the sedative. Just in proportion as we keep control over the fever will we modify the poison. When the pulse is full and bounding we add specific veratrum, twenty or thirty drops to a half a glass of water, and give a teaspoonful every one or two hours. If the

patient is a child, or if the pulse be frequent but small, aconite takes the place of the veratrum, although we add only five drops of the latter to half a glass of water. These remedies have a controlling effect upon the circulation, and so modify the disease that the patient passes safely through the trying illness.

Macrotys.—For the backache and other distressing symptoms macrotys has earned a deserved reputation. To a half glass of water add specific macrotys from one-half to one drachm. Should the skin be dry and constricted, specific jaborandi, one drachm, to water, four ounces, should be given.

Specific Echinacea.—This is to be used for the sepsis, which is shown by the full broad tongue and purplish tissues.

Baptisia.—The indications for baptisia are similar. When there is a full purple tongue and all the tissues look as if frozen, baptisia is the remedy.

Sodium Sulphite.—One of the most reliable of all agents is sulphite of sodium. The moist, dirty, pasty tongue calls for a saturated solution, a tablespoonful every one, two, or three hours.

Rhus Tox.—In children, where there is irritation of the nervous system as shown by the sharp cry and starting in the sleep, rhus tox. gtt. v, to water, ʒiv , a teaspoonful every hour, is one of our best remedies. Also where the tongue is red at tip and edges, and the stroke of the pulse is sharp.

Gelsemium.—This is to be used where there is great irritation of the nervous system, and the flushed face, bright eyes, and contracted pupils suggest either convulsions or delirium.

Other agents may be called for, but these remedies will be needed most frequently, and if faithfully used will show a very low death rate.

The room should be darkened, care being taken that, in the darkening process, the free flow of air is not obstructed.

To prevent pitting, the face and hands should be kept softened by the free use of olive-oil, and a mask, made of oil silk, with openings for eyes, nostrils, and mouth, should be used. All parts of the body *must* be protected from the light.

The patient must be thoroughly impressed with the necessity of restraining from scratching, and thus tearing the pustules, causing ulceration and, necessarily, resulting in scarring. Children's hands should be encased in mittens and carefully guarded by the nurse. If properly cared for in this way, there will be little,

if any, pitting, and one of the horrors of small-pox is thus removed.

Diet.—The diet should be of the simplest character. Milk in some form, either cow's milk or some of the artificial preparations, such as malted milk, lacta preparata, buttermilk, or koumiss, should be given. Where an acid is indicated, pepsin or sherry whey will prove useful. Broths and gruels may be given as soon as the fever subsides. During convalescence the patient is to be cautioned as to the danger of overeating.

VARIOLA VACCINIA.

Synonyms.—Cow-pox ; Vaccination.

Definition.—An infectious, eruptive disease which appears upon the teats or udder of the cow in the form of small papules, which soon become vesicles, the virus of which, introduced into the human body by vaccination or otherwise, results in a systematic disturbance, the effect of which is to effect immunity, more or less permanent against small-pox, the local lesion being followed by the well-known pit or scar.

The virus—vaccine—is obtained either directly from the calf, bovine lymph, or from a healthy person, preferably a child who has been recently vaccinated, human lymph.

History.—There is no more interesting chapter in medical literature than the discovery of vaccination by Jenner, and he is justly entitled to rank as one of the greatest benefactors of mankind. Although not the first to practice vaccination, he is justly entitled to all honor, for he conceived the idea of its great value, and pursued the subject, until it passed from the realm of speculation to that of an assured fact.

As early as 1774 Jesty, a Dorsetshire farmer, who had had cow-pox, vaccinated his wife and two sons, then went to London and presented himself and family to the inoculation hospital and defied them to give him or his family small-pox ; but the hospital physicians failed to appreciate the fact that a great discovery had literally been thrust upon them, and it remained for Jenner, after twenty years of study and observation, to prove to the world that the belief in cow-pox as a preventive to small-pox, was not a

dream, but as certain in its effects and as easily proven, as a problem in Euclid.

While a student at Sudberry he early heard of the popular belief which prevailed in the dairy districts, that any one having had cow-pox, could not take small-pox, and when one day he was consulted by a young woman and the subject of her taking small-pox was mentioned, she said, "O, I can't take that disease, for I have had cow-pox," there took root in his fertile brain an idea that was to grow and develop until it should bring forth fruit that would gladden the hearts of mankind throughout the world.

Mentioning his views to the celebrated Dr. Hunter, he was told not only to think but to act, to prove his thoughts correct, and, with a patience and perseverance born of genius, he pursued his studies for over twenty years till they thoroughly satisfied him of the truth of his discovery. He published, in 1798, "*An Inquiry into the Causes and Effects of Variola Vaccinia.*"

At last, after years of thought, the crucial test was made, and on the 14th of May, 1796, "he took matter from the vesicle of one Sarah Nelmes, who was suffering from cow-pox, and inoculated a boy by the name of James Phipps, aged eight years." The cow-pox ran its natural course, and when a little over six weeks had elapsed he was inoculated on July 1st with the virus taken from a small-pox pustule, and was rewarded by finding that, as he had predicted, the boy was proof against small-pox.

For two years cow-pox disappeared, and his labors were suspended before he could give further proof of its prophylactic power, at which time he published to the world the result of his investigations.

Was it hailed with acclamations of great joy and its author proclaimed a benefactor? Not so. His fate at first was like that of nearly all great benefactors; viz., persecution and obloquy. Even the profession rejected his views; but this could not long prevail, for proof was at hand, and in less than a year after his first announcement "several of the most distinguished physicians of London signed a declaration of their confidence in it."

From this time the spread of vaccination was marvelous. It was introduced into the United States in July, 1800, by Benjamin Waterhouse, Professor of Physics at Harvard, who vaccinated his seven children. In 1801 it was practiced in France. "In 1803 the court of Spain sent out an expedition for the purpose

of carrying vaccination to all the Spanish possessions in the Old and New World." It returned in three years, having made a circuit of the globe.

All nations hailed the discovery with joy and gladness. "In Russia, the emperor gave the name of Vaccinoff to the first child vaccinated, and made its education a public charge;" while in Germany the day of Jenner's birth and the date of his first vaccination were made feast days. Foreign courts vied with each other in bestowing honors upon Jenner. He was voted honorary membership in many learned societies, but what was more substantial was the appropriation by Parliament, in 1802, of fifty thousand dollars, and five years later one hundred thousand dollars more.

Nature of Vaccine.—The true nature of cow-pox is still unsettled. Some hold to the theory that it is small-pox modified by its passing through the cow, and numberless experiments have been made by inoculating cows with small-pox virus, the result being small-pox, and virus from the vesicles thus produced introduced into a child gave the same results as from original virus. Recent experiments by Celli, Babcock, and others, seemingly prove that genuine vaccinia may be produced by inoculating a heifer with variolous virus; on the other hand, French writers are equally positive that there is no relation existing between cow-pox and small-pox.

Browardel, in the "Twentieth Century Practice of Medicine," says, "The question is to-day settled, and settled by experiment." Chauveau, of Lyons, and some of his colleagues of the Lyons Medical Society, instituted some experiments which appear to us to leave absolutely no doubt as to the non-identity of variola and vaccinia. The experiments were as follows:

"In the first series, thirty beasts were selected without distinction of sex or age, and were inoculated with animal vaccine, cow-pox furnished by Lanoix, of Paris, and Pallasciano, of Naples. In all of them, without exception, a beautiful eruption was obtained. In all of these cases the eruption remained strictly localized.

"In a second series, about twenty animals were inoculated with humanized vaccine. The success was almost as complete as in the first series. These two series of experiments gave perfectly satisfactory, distinct, and unmistakable results, and

proved clearly the identity of cow-pox and of vaccinia cultivated in the human species."

"Let us now see whether inoculations with true small-pox virus gave the same results. Seventeen young animals, heifers and bullocks, companions of the preceding, were inoculated with the virus of small-pox. The inoculations were made with the greatest care, but none of the animals acquired cow-pox. The inoculations were not absolutely without effect, for in every case there was a formation of very small reddish papules, which disappeared rapidly by a sort of absorption, without leaving any scab. We may conclude from this that vaccine virus and that of small-pox do not give identical results.

"But what was the papular eruption determined by the inoculation of variola? Was there anything specific about it, or was it simply the result of inflammation caused by the puncture? Fifteen of these seventeen animals were also vaccinated, ten with the virus of genuine cow-pox, and five with humanized virus. Of these fifteen animals, only one showed a typical cow-pox eruption. Here was a new fact of capital importance, for it proved that the papules produced in the bovine species by variolous inoculation constituted a specific eruption, and that this eruption was related to cow-pox just as vaccinia and variola in man; that is to say, variola protects the bovine race from cow-pox just as vaccinia protects the human race from small-pox. Was this variolous eruption in the cow purely and simply small-pox? In order to determine this, a non-vaccinated child was inoculated with the serous fluid obtained from these variolous papules, and the result was a generalized *confluent small-pox*. A second child was inoculated with virus taken from the primary pustule in the first child, and it had a discrete but perfectly characteristic small-pox, but it was the papular eruption of bovine variola. We may conclude, therefore, that small-pox may be transmitted by inoculation to the cow, but it was not transformed into vaccinia in this animal's organism; it remains *variola*, and requires the characteristics of variola when implanted again in the human species."

This lengthy quotation, which shows the most recent views on this most important subject, makes clear to us that, despite the evident relation between variola in the human and the bovine races, these two affections are nevertheless perfectly distinct and

independent, one of the other, in their essence and can not be transformed one into the other.

Vaccine Virus.—The virus consists either of the lymph taken from the vesicle, or of the scab or crust resulting from the desiccation of the pustule. Of the latter but little is used. There is an idea prevalent in the minds of the laity that disorders of various kinds, such as tuberculosis, syphilis, leprosy, and, in fact, *bad blood* in general, may be transmitted by means of vaccination, and, although this is possible, it has been greatly exaggerated.

Ever since Dr. Robert Cory, chief vaccinator to the National Vaccine Establishment, England, succeeded, after repeatedly vaccinating himself with virus taken from actively syphilitic children, in contracting syphilis, all doubt that it can be transmitted has been removed; and if this is the case with syphilis, then it may be true for any other disease.

For this reason, the profession has almost entirely abandoned the use of the human virus. A number of vaccine farms have been established in the United States, and the scrupulous care with which everything is conducted reduces the danger to the minimum. After removing the contents of the vesicle with great care, ivory points are dipped in the virus, and when dry are ready for use. These points soon lose their vitality, in from ten days to two weeks, and should be replaced by fresh points. Glycerinized vaccine is now largely used. This is usually served in capillary glass tubes sealed at each end. The ivory points protected by paraffin, if kept in a cool place, retain their prophylactic power longer than the unprotected.

Vaccination.—Although a very simple operation, there is often a failure in its successful performance. If good virus is used, the percentage of failures should be very small indeed. The exposed surface should be carefully abraded, care being taken not to produce hemorrhage, and at the same time sufficient abrasion to cause an exudation of lymph. The point selected is usually the insertion of the deltoid muscle, or, if a girl, it may be in the calf of the leg.

After wiping a space the size of a silver dollar with alcohol, to insure a perfectly aseptic surface, we take either a dull knife or the vaccine ivory point and make a series of scratches, crossing and recrossing each other till the lymph oozes through; then, having moistened the virus with sterilized water, it is carefully



FIG. 10. VACCINE VESICLE NINTH
DAY, SHOWING PRONOUNCED
ARROLA. (*Welch and
Schamberg.*)

FIG. 11. TYPICAL VACCINE VES-
ICLES, TENTH DAY. (*Cut-
ler.*)

FIG. 12. VACCINE LESION IN A MULATTO, TENTH
DAY, SHOWING IRREGULAR SHAPE.
(*Welch and Schamberg.*)

wiped upon the surface and gently rubbed until thoroughly incorporated with the lymph. After the lymph and virus have become perfectly dry, a piece of lintine secured by adhesive stripes or a light bandage completes the operation.

Formation of Vesicle.—From the third to the sixth day after vaccination, a small red spot appears at the seat of inquiry, which gradually increases in size, becomes swollen and indurated, forming the base of the vesicle. This is at first circular in form and filled with a transparent, limpid fluid. The vesicle is usually three or four days in reaching maturity, when it shows the circumference hard and elevated, the center being depressed, and has a pearly gray color. The vesicle is now surrounded by a hard, inflamed surface extending for a half inch to an inch and a half in circumference, and is hot, red, and painful, and frequently the axillary glands become large and tender; or if the vaccination is on the leg, the inguinal glands become involved. About the twelfth day of the vesicle, desiccation commences, and is completed from the fifteenth to the eighteenth day, the scab dropping off the twenty-first day. The scar left is circular in form, depressed, and made up of small pits or depressions in the skin. The rete mucosum is deprived of its coloring matter, and the scar ever remains white.

During the evolution of the vesicle there is some systemic disturbance, and in nervous children, there may be quite an active fever for two or three days.

The duration of immunity can not be definitely stated; in some cases it may last a lifetime, while in others it lasts but a few years, when it is said to "run out." To secure safety it is well to be revaccinated every eight or ten years, or earlier if an epidemic of small-pox makes its appearance.

Spurious Vaccination.—We occasionally meet with cases where the vesicle develops quite rapidly, is irregular in outline, and the pustule develops early, the vesicle is filled with pus and blood, is not depressed in the center, and it dips down into the cellular tissues, resulting in a true cellulitis. Deep ulcers form, and there is serious systemic disturbance. This, of course, is not protective, no immunity following.

The most common cause is the use of old virus. In children who are debilitated and sickly, especial care must be taken, not

only that good virus is secured, but that the arm is perfectly aseptic and kept so during the entire evolution of the vesicle.

With the use of fresh bovine virus from a reputable firm, there is but a minimum of danger, and the patient is perfectly safe from contracting any of the horrible diseases at one time supposed to come from vaccination.

Value of Vaccination.—One has but to compare the history of small-pox before 1796 and that which has prevailed since its universal adoption, to be convinced that small-pox has largely lost its destructive power.

While vaccination is not invariably a preventive, nor always a permanent protection, yet in the very great majority of cases its protective property is of incalculable benefit. Isolation and improved sanitation can not account for the changed conditions, although due credit must be given them.

Modern small-pox has been shorn of its terrors through vaccination, most cases assuming the discrete form or appearing as varioloid, while the mortality has been reduced from thirty to forty per cent to six or eight per cent.

VARICELLA.

Synonym.—Chicken-pox.

Definition.—An acute, specific, and infectious disease, occurring during infancy and early childhood, and characterized by an eruption that rapidly passes through the stage of papule, vesicle, and pustule, and terminates by desiccation, the entire period of this evolution not occupying more than from three to five days. There may be successive crops of the eruption.

The disease is attended by slight fever, though sometimes the thermometer will be the only means of revealing it. If ulceration take place, the true skin is invaded and a pit or scar results.

Etiology.—All efforts to isolate the micro-organisms or the contagium, whatever that may be, have failed. While there is no doubt that the infectious material is to be found largely in the vesicle, it is also generally recognized as being in the expired air. It occurs sporadically or as an epidemic, and is essentially a disease of childhood, though adults are not entirely exempt.

It was at one time believed to bear some relation to small-pox,

a modified form; but experiments have proven the erroneousness of this view, for chicken-pox never protects against small-pox, nor *vice versa*. One attack protects the individual from a second, the same as the eruptive fevers in general.

Pathology.—The only definite pathological condition arises from the exanthem. Dr. Hyde thus describes it: "Manifestly, the exanthem is exudative in type, the serum, in circumscribed areas lifting the superficial layer of the epidermis from the deeper parts of the derm. Unquestionably, septa occur in typically developed varicella chambers, similar to those seen in variola, a pathological fact which is the corner-stone of the doctrine relating to the unity of the disorders. The serum contained in these septa possesses an alkaline reaction. The formation of a cicatrix is evidently due to the intensity of the process in certain exceptional lesions, as a result of which the papillæ of the corium are superficially destroyed. These sequelæ are often due to the picking and scratching of the lesions."

Symptoms.—The period of incubation is usually longer in this than the other eruptive fevers, varying from ten to fifteen days, with an average of fourteen days. Prodromal symptoms are generally absent, though in exceptional cases there will be a chill followed by headache, restlessness, and fever. Convulsions are very rare. Usually the eruption is the first symptom to attract the mother's notice, and the one enabling the physician to make the diagnosis.

The eruption first appears upon the upper half of the body, upon the back, chest, and face, and especially over the scalp, then the body at large.

The eruption at first somewhat resembling the rose rash of typhoid fever, appears as slightly elevated macules or papillæ upon which the vesicles early make their appearance.

Within a few hours the vesicles become filled with a clear, colored fluid, the epidermal layer being very thin, giving the vesicle the appearance of a drop of water. The vesicles are round or oval, and vary in size from a pin-head to a small pea. Within twenty-four hours the contents become opaque, and soon turn yellow from the presence of pus cells, although they do not become purulent. They maturate rapidly, so that by the third day they are becoming brown, at which time they are flat or slightly depressed, with occasionally slight umbilication. There may be

slight erythema at their base, or they may appear as set upon the surface, without any inflammation.

They vary as to number, from a scattered few to several hundred. In the case of my little niece, the vesicles through the hair were so numerous that one could scarcely place a finger upon the scalp without touching a vesicle, while the face and body were but little less affected, in fact resembled very much in appearance a case of confluent small-pox.

In well-marked cases, vesicles form upon the mucous surfaces, the inner surface of the lips, the roof of the mouth, and upon the soft palate.

The roof of the vesicle soon gives way, and they appear as small ulcers.

The stage of decline begins the third or fourth day, and as the contents become absorbed or ooze away, the vesicles become wrinkled or puckered, which are now brown in color, and begin to fall off by the fifth day; this continues for several days.

At first a purplish red spot marks the site of the vesicle, though the normal color is soon resumed. If the cutis vera has been invaded, a small circular white pit or scar follows, which is retained through life.

When the eruption is extensive, vesicles form upon the prepuce in the male and in the vagina in the female, which gives rise to painful and difficult urination.

Successive crops of vesicles appear, so that one can observe, on the same patient at one time, the eruption in all its stages, from the rudimentary macule to the desiccated pustule. The vesicles of the first crop are the most perfect, those following many times being aborted, the macule disappearing or the vesicle formed is small and imperfect.

There is usually but little systemic disturbance, though occasionally the little patient has quite an active fever and is quite sick for twenty-four or forty-eight hours. In rare cases the glands of the neck are swollen and painful.

Hutchinson describes a "varicella escharotica" in which gangrene occurs about the vesicles, and Andrew describes a hemorrhagic varicella in which there is bleeding from the mucous membrane.

Diagnosis.—As a rule the diagnosis is very easily made. The absence of prodromal symptoms, the appearance of the vesicles,

which more clearly resembles a small blister, the absence of the shotty papule, and swollen base and red areola, and the early maturity of the vesicle, the successive crop of vesicles, whereby all stages of development are seen at one time, enables the physician to make a positive diagnosis.

Prognosis.—This is the most simple of the exanthematous fevers, and the prognosis is always favorable.

Treatment.—But little treatment is required. We direct a sponge-bath, and, if feverish, put the patient upon aconite and asclepias, or, if there is much itching or burning of the skin, use rhus tox; especially is this indicated where the child is restless. Should the glands of the neck become swollen phytolacca will be the better remedy, twenty drops to a half glass of water.

Should there be much itching, sponge with a weak solution of boracic acid, and see that the hands are bandaged or placed in mittens to prevent scratching; for if the vesicles of the face are torn, pitting will follow.

If the bowels are constipated, they should be moved with a mild cathartic.

SCARLET FEVER.

Synonyms.—Scarlatina; Scarlet Rash.

Definition.—Scarlet fever, or scarlatina, is an acute contagious disease of childhood, characterized by a bright, scarlet-colored, punctiform eruption, diffused over the entire body; by an angina more or less severe; by a fever so variable in character that it may only be detected by the thermometer, or so severe as to rapidly destroy life, the thermometer registering higher in this than in any other fever; and by a marked tendency to nephritis, the disease finally terminating by desquamation of the skin.

History.—The early history of scarlet fever is not very reliable, as it was for a long time regarded as a variety of measles, and the first definite and distinctive name that gave it as a separate and distinct disease must be credited to Sydenham, who carefully studied its characteristic features and clearly separated it from the other exanthemata.

Early writers—viz., those of the Italian school—may have used the term scarlatina, yet it is very doubtful if it was applied to this distinctive fever.

From the time of Sydenham, 1685, till the present, scarlet fever has prevailed, progressively increasing as the years have passed, until to-day it has become endemic in all the large cities of the world, while epidemics of varying severity have visited, from time to time, Europe and America.

The disease may occur sporadically or as an epidemic, and, though essentially a disease of childhood, no age is exempt. It is the most severe and fatal of all the exanthematous fevers. One attack renders the patient immune.

Etiology.—Ever since scarlet fever became isolated as a specific disease, the medical profession has been studying the nature of the poison, and yet the *materies morbi* has elusively escaped the search of the student.

For thirty years the bacteriologist has sought in vain for a micro-organism as a cause of the contagion, and though several observers have found, what seemed at first, satisfactory evidence of a specific germ, closer investigations have revealed their mistakes.

Klein thought he had discovered the poison to be due to a disease of the cow. An epidemic of scarlet fever broke out in London in December, 1885, and the outbreak could be traced to the milk supplied by a herd in Hendon. The cows were affected by a peculiar disease which he believed to be scarlet fever, and he discovered from the discharges that occurred from the ulcers on the affected cows, a micro-organism which he believed to be identical with the micro-organism which he had found in the blood of human scarlet fever patients.

C. B. Brown's investigation, however, showed that milk from other herds affected with the same disease did not cause scarlet fever, and that milk from the Hendon herd must have been contaminated by scarlet fever existing in the neighborhood. So of other animals that have conveyed scarlet fever, they have only been the media of conveying the disease from one person to another.

All that we know positively is, that there is a specific infection, that it is volatile, minutely divisible, and diffused so quickly that it spreads from one to another with marvelous rapidity.

It possesses great tenacity and vitality, and may reproduce itself in a favorable soil after lying for years. Thus Hildebrand's coat is said to have transmitted the disease eighteen months after

it had been in contact with scarlet fever, while Boech reports a case in which two children of a physician contracted scarlet fever by playing with locks of hair which had been cut from the heads of two children who died from scarlet fever twenty years before, the hair having been enclosed in a drawer during the interim.

The infection is found in the expired air, the secretions and in the epidermis. It fastens itself upon the clothing, furniture, drapery, toys, letters, flowers, hair, in fact anything animate or inanimate that comes in contact with it. It may be carried in a letter written in the sick-room to one many miles distant. All that seems necessary to contract the disease is to come in contact, for ever so brief a period, with the impregnated air or body upon which the infection is found.

It is probably most contagious after the eruption makes its appearance and during the period of desquamation.

Predisposing Cause.—*Age.*—While no age is exempt, it is essentially a disease of childhood. Infants are not so liable to contract the disease, although cases have been recorded where the child was born with it. The ages most susceptible are between two and eight years. After ten the susceptibility diminishes, very few indeed contracting the disease after reaching adult life.

The great value of isolation is thus seen; for if one can protect the child until he is ten years old, but little danger exists. Neither sex nor race seems to influence the predisposition. Social position seems to have but little influence, the rich and favored suffering alike with the poor.

Season.—Autumn and winter show a greater number of cases than spring and summer.

Wounds.—Open wounds, either accidental or surgical, increase the susceptibility to the poison.

Pathology.—There are no characteristic or specific changes to record, the changes which do take place in the viscera being the same as are found in all fevers of an intense character. The blood is dark, diffuent, and does not coagulate readily, owing to a defect in the fibrin.

Should death be delayed to an advanced stage of the disease, it is usually the result of septicemia, nephritis with dropsy, or the result of an endocarditis, pericarditis, or meningitis.

The eruption is due to the hyperemia of the skin during the dermatitis, and disappears after death, except in those malignant

cases where the eruption failed to appear during life, and appears upon the death of the patient, confirming the diagnosis.

The change which takes place in the throat resembles that of simple inflammation, tonsillitis, or cynanche maligna. In some, only the superficial tissues are involved, as may be seen by the vivid redness, while in others the inflammation assumes a phagedenic character, dipping down into the deeper tissues, which, sloughing, reveal ragged and foul-looking ulcers. Extending to the deeper tissues of the neck, large abscesses may form. The cervical glands become involved in the malignant form, and occasionally suppurate, leaving ugly, cold abscesses.

Where the angina is severe, there may appear early a membranous exudation, pseudo-diphtheria; but if the exudation does not occur for a week or ten days, it is usually true diphtheria with its attendant symptoms. The kidneys present the characteristics of acute nephritis or Bright's disease. (See Bright's Disease.)

Symptoms.—The symptoms of scarlet fever depend largely upon the form or variety. In some cases the disease is so mild as to require considerable skill in recognizing it, while in others it will be so severe as to destroy life in thirty-six or forty-eight hours. This great diversity of symptoms has led authors to divide the disease into three varieties: *Scarlatina Simplex*; *Scarlatina Anginosa*; and *Scarlatina Maligna*.

In some seasons the disease will prevail in the simple form, while another season will reveal all of the anginose form, or the epidemic may show the most malignant type.

Incubation.—The period of incubation varies from two to eight days, though the average time is from four to five days; but where the disease is intense it may not be over twenty-four hours. Prodromal symptoms are usually absent, though the child may show slight indisposition.

Invasion.—The invasion of the disease is sudden. Frequently the chill is the first evidence, followed by a high fever and very grave symptoms are present in a few hours. Again in highly sensitive children a convulsion will mark the beginning of the disease. Either case is usually accompanied by vomiting. The pulse is very rapid, the temperature rapidly increases, and the child complains of great heat, which is pungent in character.

The angina very early develops, and, even where the child

has not complained of pain, an inspection of the throat will reveal the fauces, tonsils, and uvula a vivid red, with considerable swelling and the sensation as though something was filling or obstructing the throat. In the simple form these symptoms are not so marked.

In twenty-four or forty-eight hours, though it may be delayed to the fourth day, the eruption appears upon the neck and chest, soon extending over the entire body. The exanthem consists of an infinite number of punctate points surrounded by an erythema that gives the bright scarlet color from which the disease takes its name. There is no cessation in the fever with the appearance of the eruption, as in other fevers. The eruption remains from two to six days, gradually fading away, and is followed by a branny desquamation.

Anginosa.—Dr. Scudder has given so realistic a picture of this form that I will quote him in full: "In *S. anginosa*, the chill is usually marked; there is nausea and vomiting, pain in the head and back, thirst, etc. The fever which follows is intense; the skin is dry, husky, and burning; the eyes dry and painful; the face congested and tumid; bowels constipated; urine is scanty, frequently voided, high-colored, with marked irritability of the nervous system. Soreness of the throat is complained of from the first, with difficult deglutition, and, on examination, we find the fauces tumid and red and the tonsils somewhat swollen. The nares are frequently implicated with the angina, and there is consequently stuffing of the nose, with difficult respiration, and consequent increased restlessness.

"The eruption sometimes makes its appearance during the latter part of the first day of the fever, but, more frequently, not until the second or third day, and about the third or fourth day it has reached its height. At the commencement, there appears slight tumefaction of a portion of the surface, which gradually assumes a rose color, and the minute red points are developed. These patches increase in size until the greater portion of the surface is involved. During the eruption there is an expression of anxiety and suffering; the child is restless, uneasy, and sleeplessness, which resists the usual means of rest, is caused by the heat and stinging of the surface, and soreness of the throat.

"The throat affection is here the most prominent feature; the soreness increases, the mucous membrane and subjacent tissues

are engorged and tumid, and the secretion from the mucous follicles and salivary glands is so viscid and tenacious as to cause great distress. In some cases ulceration commences by the fifth or sixth day of the disease, and the secretion is difficult of removal and exceedingly offensive; occasionally the ulceration assumes a phagedenic form, and speedily terminates the life of the patient. Frequently enlargement of the cervical lymphatics commences from the third to the sixth day, and, if not promptly treated, terminates in inflammation and suppuration.

"The fever, under appropriate treatment, commences to abate when the eruption has made its appearance, and disappears entirely by the fourth or sixth day, when desquamation commences. As this progresses, the surface becomes paler, the epidermis exfoliating in whitish scales, or in large pieces where it is thick; sometimes desquamation is retarded for two or three weeks."

Scarlatina Maligna.—Some seasons, for reasons unaccountable, scarlet fever appears in a malignant form. Such an epidemic occurred in the winter of 1879 in the little village of Harrison, Ohio, nearly every case resulting fatally, and this was my first introduction to scarlet fever. So intense was it, and so fatal in its results, that I have ever had a dread of this disease, and when scarlet fever appears, there rises before me a picture of that epidemic of 1879.

We may divide this variety into two forms,—the nervous, and the excessively toxic. In the first form the child is suddenly stricken; the chill is short and the febrile reaction extreme. The skin is intensely hot, dry, and pungent; the mouth is dry and parched; the eyes are brilliant and burning; the face is turgid; the head is hot and painful; the throat becomes dry, tumid, and swollen; the patient is restless and delirium early ensues. There is nausea and vomiting of a persistent character; convulsions are the rule.

Within twenty-four hours the intense excitement gives away to stupor. The child lies with the eyes partly open, the pupils are dilated, the surface seems dusky and swollen, the temperature reaches 104° to 105°, the pulse ranges from 160 to 170 beats per minute, and within thirty-six to forty-eight hours death ends the scene. In this case, if the eruption appears, it is a dingy red, and appears slowly, though the patient may succumb before it shows itself upon the surface.

In the second form, the disease is but little less fatal, though not so rapid. There is great prostration from the beginning. The chill is greatly prolonged, febrile reaction coming up slowly, the evidence of extreme sepsis being seen from the beginning. The child is dull and stupid, and the countenance vacant and besotted. The face is dusky or turgid and the heat of the body pungent, though the extremities are inclined to be cold. The tongue is broad and heavily coated, or dry and parched. Nausea and vomiting frequently occur, and diarrhea is common. The urine is highly albuminous.

The throat affection is characteristic; at first dry and tumid, it soon shows a dirty, moist exudate, so that it is not infrequently taken for diphtheria. The deeper tissues become infiltrated, and a foul phagedenic ulceration is seen. The nares becomes involved, and an acrid secretion is discharged.

As the sepsis increases, a cellulitis develops, the cervical glands enlarge, the neck becomes greatly swollen, extending in some cases beyond the ears. The eyes are glued together with a brownish secretion, while the ears discharge the same characteristic material. The system seems to have more of the poison than it can carry, and the overflow escapes by way of the orifices.

The cervical glands suppurate, and a disgusting, pultaceous abscess is the result. The extremities become cold, the pulse is small, weak, and rapid, the mind is dull, coma comes on, and the child dies from toxemia.

The eruption, when it makes its appearance, is of a dull, dusky red color. Sometimes it appears as petechiæ, which, enlarging, form ecchymotic patches. At other times it appears the second or third day, only to remain a few hours, when there is a retrocession of the eruption.

Desquamation.—From six to ten days after the eruption first makes its appearance, desquamation begins. The eruption fades, the skin becomes dry and constricted and is shed in the form of dry, bran-like scales. Sometimes it comes off in large flakes or even in ribbon-like strips a foot or more in length, and in rare cases, where the epidermis is thick, like on the hand or foot, a complete cast of the member is shed.

Desquamation lasts from ten days to ten weeks.

Complications.—In scarlet fever, diphtheria, measles, and in-

fluenza, the middle ear is often affected by extension through the Eustachian tubes and the process may also affect the labyrinth.

In quite a number of cases the labyrinth is affected directly by the systemic poison, the middle ear escaping any morbid inflammation whatever. (Foltz.)

Respiratory Apparatus.—The inflammation may pass from the throat to adjacent parts of the respiratory apparatus, and bronchitis or broncho-pneumonia may render the disease still more serious. Nephritis is a very common complication, though more frequently it is one of the sequelæ.

Post Scarlatinal Nephritis is the most serious of all the results of scarlet fever. This may occur from the first to the fourth week after convalescence, though many times it comes on so insidiously that it is difficult to trace its beginning. Albumen is found in the urine, and the child is inclined to be dull and lifeless. The skin is dry and more or less constricted, the pulse small and wiry, the tongue dry and fissured, the face puffy, and the feet edematous. There is pain in the back and loins, the urine is scanty and high colored.

If the treatment be successful, the urine increases in quantity, is light in color, the skin becomes moist, and soon convalescence is established. In the graver cases, however, the dullness increases to coma, the pulse becomes small and feeble, the extremities are kept warm with difficulty; the temperature is sub-normal, the tongue is dry and brown, nausea and vomiting ensue, and diarrhea is not uncommon.

Hemorrhages may occur from the mucous surfaces, and muscular twitchings announce the approaching convulsion which often terminates the attack. During the course of inflammation of the kidney there is a tendency to cardiac changes. Dilatation of the heart, or endocarditis, or pericarditis may so weaken the heart that death may occur suddenly and when least expected.

Ear Complications.—One of the serious results of scarlet fever is deafness. The inflammation extending along the Eustachian tube is followed by suppuration and perforation of the membrane. A mastoid abscess is not infrequent. The patient may be left with a fetid discharge from the ear.

Diagnosis.—The diagnosis of scarlet fever is usually, readily made by the rose-colored efflorescence upon which are the innumerable small red points. The eruption is readily effaced by

pressure, which leaves a white mark for several seconds before the redness is re-established. The characteristic sore throat and the strawberry tongue are also suggestive.

Belladonna produces a scarlatinal rash, but the history and absence of sore throat will enable one to avoid a mistake in diagnosis. It is distinguished from measles by the absence of catarrhal symptoms and by the irregular eruption commencing on the face and occurring in blotches.

Prognosis.—The prognosis will depend largely upon the character of the epidemic, the previous health and age of the patient, and the complications which may attend the attack. Thus in scarlatina simplex, the prognosis will be favorable, every patient recovering, while the epidemic may show such intense malignancy that nearly every case may prove fatal. For example, in the winter of 1879 in the village of Harrison, Ohio, containing two thousand inhabitants, nearly every child who contracted the disease died. The prognosis is more unfavorable among infants, where nephritis occurs, and where there are cardiac changes. The older the patient the more favorable, the prognosis being just the reverse of measles.

Treatment.—*Prophylaxis.*—As this is one of the most contagious of all the eruptive fevers, and also the most serious, great care must be exercised to exclude the well members of the family. The child should be isolated and all intercourse with the patient prohibited. All upholstered furniture and unnecessary draperies, as well as carpets and rugs, should be removed from the sick-room.

The nurse should not mingle with the family, and all clothing worn by the nurse and patient, together with the bed linen, thoroughly disinfected before others come in contact with the sick-room. During the period of desquamation the patient may be anointed daily with olive-oil, after sponging with warm water and asepsin soap. The rooms should be thoroughly aired each day, care being taken that no draughts be allowed on the patient.

As a prophylactic, the members of the family who have been exposed may take belladonna, although it is questionable whether it possesses the virtue attributed to it as a preventive of the disease. Dr. Webster suggests "the use of echinacea as a prophylactic, or rather as an agent to fortify the blood against sepsis, the tissue against phagedena, and the cerebro-spinal centers against

acute morbid changes." The medical treatment for scarlet fever, like that for any other disease, depends upon the conditions present.

In mild cases the treatment is simple. Aconite and belladonna, of each five drops; water, four ounces, teaspoonful every hour. For local throat trouble use a gargle of chlorate of potassium and phosphate of hydrastine. Sponge the patient once or twice a day in warm alkaline solution, which carries off the surplus heat, renders the skin soft and pliant, and favors the eruption. If the child is restless, with flushed face, gelsemium will replace the belladonna. For the itching, nothing serves a better purpose than the old, though crude, bacon-rind.

In scarlatina anginosa greater skill will be required. For the high grade of fever, to assist the sedative aconite or veratrum, the patient should be sponged frequently with warm soda-water. If the stomach will retain jaborandi, this agent will be found useful, one or two drachms to four ounces of water; teaspoonful every hour.

The throat affection is here the most prominent lesion. Cloths wrung out of hot water and vinegar and applied to the throat, over which a dry flannel should be placed, will be found of much benefit. The patient may also inhale the steam from vinegar and hops, which will give relief to the dryness of the throat.

Internally phytolacca and echinacea will be given. A gargle of potassium chlorate and hydrastis will also give relief, or a spray or gargle of echinacea may take the place of the potash. Where there is nausea and vomiting, with the characteristic strawberry tongue, or where the patient is restless and unable to sleep, rhus tox. will be found the best agent. Hydrochlorate of ammonia, in from one to three grain doses, is highly recommended by many, though I have never used it, and can not speak from experience.

In the malignant form of the disease, sepsis is the condition to overcome, and antiseptics will be especially indicated. For the dirty, moist, pasty tongue, a saturated solution of sodium sulphite, both internally and as a gargle, will be our best agent. If there be a foul breath, a cadaveric odor, I know of nothing that will equal potassium chlorate and hydrastis. Where the tissues are infiltrated and dusky, echinacea given internally, used as a spray, and applied to the neck, will give good results. Baptisia may be

combined with the latter agent, as the action is similar. Where there is marked dullness, the surface dusky, and the eruption retarded, the old-time emetic of capsicum and lobelia will prove of great value. Where there is enlargement of the lymphatics, phytolacca, twenty to sixty drops to a half glass of water, will be the indicated remedy. Where the face becomes puffy and edematous, apocynum, ten to twenty drops in a half glass of water and a teaspoonful every hour, will give great satisfaction.

The nourishment must be fluid in character, milk being the best food when it can be taken. Great care must be taken during convalescence, the quantity of urine noted, and occasionally examined for albumen. There are so many unpleasant sequelæ following scarlet fever that the physician can hardly be too careful during this period.

MEASLES.

Synonyms.—Moribilli; Rubeoli.

Definition.—An acute, infectious, and contagious fever, characterized by a general papular eruption, usually appearing the fourth day, and preceded by a catarrh of the mucous membranes of the bronchi, larynx, nose, and eyes.

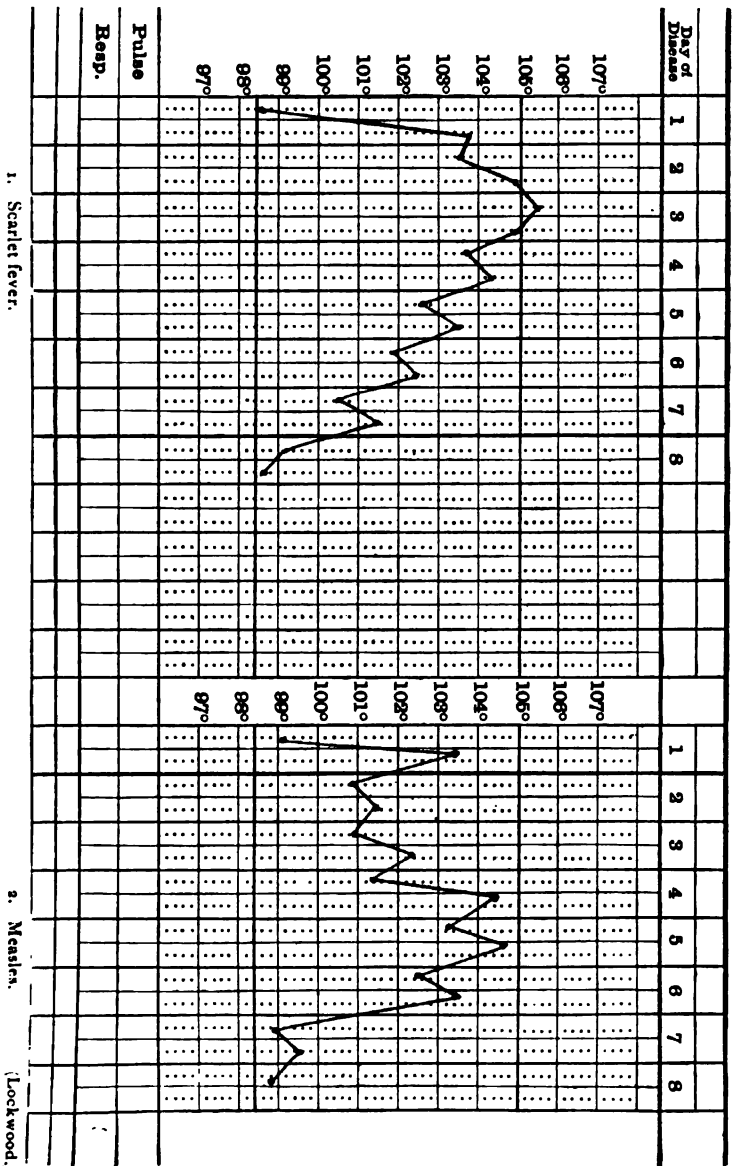
Etiology.—The infectious material, whatever it may be, is found in the blood, in the secretions of the mucous membranes, and in the epidermic scales which are cast off. It is exceedingly volatile, and the presence of the unprotected in the near neighborhood is sufficient for the contraction of the disease. When once it enters the home, it usually infects all children who have not previously suffered from an attack. Unlike scarlet fever, the older the patient, the more severe the disease.

It usually occurs in epidemic form, though sporadic cases may occur. In the larger cities it may be found more or less at all seasons of the year, and may therefore be said to be endemic. While a single attack is generally supposed to confer immunity, a second or third attack is not uncommon, the soil not being exhausted as in other exanthemata.

The attempt to isolate a specific germ which will produce the disease has thus far failed, though many micrococci have been found in the secretions.

SCARLET FEVER.—MEASLES.

Plate 13-14.



1. Scarlet fever.

2. Measles.

(Lockwood.)

Pathology.—There are no characteristic lesions in measles, save the catarrhal conditions of the respiratory apparatus. Where death occurs, it is usually the result of complications, capillary bronchitis, and broncho-pneumonia being the most frequent. The other changes are common to those of grave fevers, such as lack of coagulability of the blood, which is dark in color. The internal organs are congested and softened. The lesion of the skin, consists of an acute hyperemia, with exudation in the vascular papillæ of the corium, the sebaceous and sweat glands.

Symptoms.—The symptoms vary, being so mild some seasons that the child does not take to its bed. At other times the malignant character is manifest from the beginning, as seen by the characteristic septic symptoms.

Incubation.—From seven to fourteen days elapse from the time of exposure to the infection, to the first evidence of the disease, and is regarded as the period of incubation. During the time when the poison is at work upon the blood, multiplying itself a thousand-fold, the patient may manifest no symptoms of its presence.

Invasion.—The first manifestation of the disease is the presence of catarrhal symptoms. The child seems to have taken cold, and sneezes frequently. There is a watering of the eyes, stuffing up of the nose, with increased secretion and discharge of mucus. There is increased sensibility to light, hoarseness, and a dry bronchial cough. These symptoms may precede the chill twenty-four or forty-eight hours, or occur simultaneously in the cold stage.

Following the chill, febrile reaction comes up, but varies greatly, in mild cases scarcely noticeable, while in others the temperature reaches 103° , 104° , or even 105° . The skin is hot, flushed, and dry, the pulse hard and wiry, with marked irritation of the nervous system. The child is sensitive to the light, and intuitively screens its eyes from the glare. The cough is a constant factor, and is hoarse or metallic and irritating. The fever is generally remittent in character, and increases to the third or fourth day, then, as the eruption makes its appearance, gradually declines.

The eruption first appears upon the face, forehead, neck, and chest, gradually extending over the entire body. The single point of the eruption is a flat or slightly conical papule (much the color of a mosquito-bite), growing quite irregular as it de-

velops, while the color gradually shades to the sound tissue. They are inclined to coalesce in patches, though, where the eruption is profuse, it is confluent, every part being affected. In these cases the face and tissues are puffy and swollen, the eyes are red and watery, the tongue is covered with a dirty, moist, pasty coating, and there is a peculiar and characteristic odor.

The eruption requires from forty-eight to seventy-two hours for its full development, remains from one to three days, and then gradually disappears, the surface being clear by the sixth or eighth day, though the skin may present a mottled appearance for several days after the disappearance of the eruption.

During the one, two, or three days the eruption is coming to the surface, the child will be quite sick, the fever active, the skin dry, the cough hard, dry, and almost incessant, attended by more or less dyspnea; with the full development of the eruption, however, the fever rapidly subsides.

With the disappearance of the eruption, there is a desquamation of the epidermis, not in branny scales as in scarlet fever, but a very fine epidermic powder, and often not perceptible to nurse or doctor.

Malignant Measles.—This is the so-called black measles, the surface presenting a dusky or dark purplish hue. This variety differs from the more simple form in the toxic character of the infection. Some seasons nearly every case partakes of this character, though why this difference the profession has not been able to explain, and we only know that the infectious material, having attained a high septic character, has the property of transmitting the same intense character to all infected. In one class of cases the eruption is tardy in its appearance.

The fever runs a pretty active course, with considerable bronchial disturbance, the fourth, fifth, or sixth day passes without its full appearance. The surface becomes swollen and of a dusky hue, while the eruption can be seen indistinctly beneath the surface. The pulse is oppressed, the temperature 104° or 105° ; the tongue is broad and thick, with a dirty, pasty coating; while the breath is peculiarly fetid; in fact, so characteristic is the odor that the physician could almost diagnose the disease, in the dark, by the odor alone.

The patient is dull, with the pupils of the eye dilated. The cough is hoarse and frequent, with more or less dyspnea. The

eruption is darker in color than in the simple form, and the tissues seem edematous as though infiltrated.

"In another class of cases, the symptoms of malignancy are manifested early in the disease. The pulse is smaller and faster, the skin is flushed, but dry and dusky, and the tongue is covered with a dirty fur, with a tinge of brown. The nervous system suffers especially in these cases. In some there is great excitement for the first day or two, even delirium and sometimes convulsions, afterward coma. In the majority of cases, however, dullness and hebetude are marked symptoms; the child dozes with its eyes partly open, the coma gradually increases till the child can not be aroused. In all these cases the eruption is more or less dusky, or it may occur as petechial patches, and hemorrhage may occur from the various orifices of the body.

"Retrocession.—There may be retrocession of the eruption of measles at any time after it has appeared. In the milder form of the disease this increases the fever and the bronchial irritation, and, though unpleasant, is not dangerous. In other cases we will find the nervous system suffering severely from the retrocession, and, if it continues, the blood also becomes impaired. In these cases dullness, stupor, and coma follow one another rapidly; the skin is dusky, the temperature increased, the tongue becomes brown, and sordes appear upon the teeth. These symptoms are of a grave character, and unless prompt means are employed to bring the eruption again to the surface, it may terminate fatally in a short time." (Scudder.)

Irregular Course.—While measles usually presents a uniform course and is readily diagnosed, we are not to forget that occasionally a case will present itself which is somewhat puzzling to the practitioner, owing to the absence of some one of the prominent stages. Thus, there may be an absence of the catarrhal symptoms, "*Moribilli sine catarrho*," the eruption appearing without the customary announcement; or these earlier symptoms may be present, suggesting measles, and yet no eruption appear, though the cough and catarrhal symptoms point to measles. This has been termed *Moribilli sine exanthemate*.

Complications and Sequelæ.—Perhaps the most frequent and also most severe complication is that of some part of the respiratory apparatus. While a certain degree of bronchitis attends

every case of measles, yet there may be an extension to the smaller bronchioles and a broncho-pneumonia result, or, in delicate children, a capillary bronchitis develop.

These complications usually occur among debilitated children, and are recognized by the adventitious sounds; viz., the crepitant, followed by the subcrepitant rales. These complications, of course, add to the gravity of the disease.

Conjunctivitis.—This is not an uncommon complication. There is marked congestion of the conjunctiva, a high grade of inflammation is set up, suppuration occurs, giving rise to purulent ophthalmia. Granular ophthalmia tarsi is apt to result from this complication.

Catarrhal inflammation of the middle ear is one of the distressing complications, as it leaves a serious lesion behind. The inflammation is followed by suppuration and perforation of the membrane, deafness being a result.

Catarrh of the intestine is not an infrequent result, especially if an injudicious use of cathartics has been made in the beginning of the disease. Stomatitis is somewhat rare, though occasionally present, the inflammation extending to the throat.

Following measles, the child, debilitated by the combined forces which have been at work, falls an easy prey to the ravages of tuberculosis. The soil is ready for the phthisical germs, and their further development speedily follows.

Diagnosis.—The diagnosis of measles is usually readily made. It is recognized from scarlet fever by the longer-period before the eruption, by the irregular and blotchy character of the eruption, the absence of sore throat, the presence of the bronchial cough, and the initiatory catarrhal symptoms.

From rubella, by the absence of the enlarged post-cervical lymphatics, the congested fauces, and the short prodromal stage and slight fever of the latter. From variola, by the shotlike character of the papules of the latter and their subsequent evolution.

Prognosis.—Measles is generally regarded by the laity as of little consequence, and something which every one must undergo, and the physician who has never passed through an epidemic of the malignant variety, or seen a serious complication, is prone to regard the disease of minor importance.

In all mild or uncomplicated cases, the prognosis should be favorable, but where the child is delicate, or has a feeble vitality,

and the disease is attended by respiratory complication, or if it is of the malignant type, the prognosis must be guarded, though even here, if skillfully treated, the mortality should not be very large.

Treatment.—There are no prophylactic measures which can be said to be successful when an epidemic of measles makes its appearance in a community, and there are no means of hedging it in. It permeates the air, and the children contract the disease, though not necessarily exposed directly to a patient suffering from it; and while a few may escape by isolation, they are the exception.

To limit it as far as possible, the same precautions should be taken as in other diseases of infectious character; viz., the thorough disinfection of all the excretions, perfect cleanliness in the sick-room, a thorough disinfection of the sick quarters, together with the clothing of the nurse, upon the recovery of the patient.

The medicinal treatment of measles, unless complicated, is very simple. The child should be put to bed, even in mild cases, to avoid dangers which would arise from exposure. Sponge the surface with warm soda-water, and give the child a hot foot-bath. Internally, the small dose of aconite and asclepias will modify the fever and favor the eruption. Where there is restlessness and inability to sleep, or where the child cries out in the sleep, rhus tox. will replace the asclepias. For the initiative cough, drosera will be called for, drops ten to twenty in a half glass of water and given in teaspoonful doses every hour.

The emetic powder on a larded cloth over the chest will be found beneficial, not only in relieving the respiratory irritation, but also in hastening the eruption. Where the cough seems to arise from the larynx, as indicated by a tickling sensation in the throat, nitrate of sanguinary will prove efficient—a fourth or half grain of the nitrate to half a glass of water; or a small powder of the third trituration given hourly brings relief. Where the child has difficulty in breathing, and there is oppression of the pulse, give ten drops of lobelia to half a glass of water in teaspoonful doses every hour. If there be pain of a sharp character in the chest, bryonia will be the remedy, four drops to a half glass of water. Tartar emetic 2x or 3x is highly recommended by Dr. Webster.

In the severer form of measles, the child will need more care—

ful attention. Specific medication, however, promises the best results, for though sepsis will be the chief condition with which we have to deal, experience has proven that every case can not be successfully treated by the same prescription. There seems to be different kinds or manifestations of the toxin, and by careful study we may meet these conditions with appropriate antiseptics.

When the eruption is tardy in making its appearance, and the child's face is flushed and dusky, pupils dilated, the child is dull and passive, belladonna, ten drops to half a glass of water, will be the remedy. The older Eclectics obtained good results from the lobelia emetic, and it would be difficult to convince one who had succeeded by this means to trust the specific action of the small dose.

Where there is a broad, pallid tongue, with a *dirty, white, moist, pasty* coating upon it, nothing equals sodium sulphite given in from one to three grain doses every two or three hours. If the tongue presents a dry, sleek or glossy appearance, with redness of the mucous membrane, muriatic acid takes the place of the alkali. Where the breath is foul and the tongue is moist, with a yellowish coating, chlorate of potassium with hydrastine will be more effective than either of the above-mentioned remedies. Where the face is dusky, the tongue is full and thick, with duskiness of the mucous membranes, echinacea will be one of the best antiseptics. If there be any cerebro-spinal complication, the indications for that remedy will be all the more marked.

Where there is intestinal complications attended by diarrhea, aconite and ipecac, five drops of each to half a glass of water, in teaspoonful doses, will be useful, or ipecac and subnitrate of bismuth in mint-water may be called for.

The diet should be bland and nourishing. Hot milk is preferable, but if the patient objects, malted milk, either as a drink or prepared as a broth, will be readily appropriated. Meat broths should not be allowed till the convalescent stage has been reached. Tepid baths should be used daily, and the patient kept in a darkened room to protect the eyes.

During the convalescent period the child must be carefully watched; for it is during this stage, when the skin is peculiarly sensitive, that the danger from unpleasant sequelæ arises.

RUBELLA.

Synonyms.—Rotheln; Rubella Notha; Epidemic Roseola; German Measles; French Measles; Hybrid Measles; Bastard Measles.

Definition.—An acute contagious disease, characterized by an eruption of a papular form, resembling in some respects both measles and scarlet fever, and in others, possessing characteristics not present in either. A mild fever, accompanied by enlargement of the lymphatics, especially the cervical, submaxillary, auricular, and suboccipital.

Etiology.—It is propagated by a contagion, though the exact nature of the poison is not known. It is specific in character, and one attack generally insures exemption from another, though it does not afford immunity from either measles or scarlet fever. It generally occurs as an epidemic, and affects children rather than adults, though age is no barrier to the disease. The contagion is spread in the clothing by fomites, exhalations from the skin, and also probably by the other excretions.

Symptoms.—This is one of the mildest of the eruptive diseases, if we except varicella. The stage of incubation is from ten days to two weeks.

The stage of invasion varies; in some the appearance of the eruption is the first evidence of the disease, though usually there is some chilliness, headache, pain in head, back, and limbs, coryza, slight sore throat, and tenderness and swelling of the superficial lymphatics of the neck.

The fever is mild, the temperature rising to about 100° , though in rare cases it may reach 103° . The eruption usually appears within twenty-four hours after the invasion, upon the face and neck, gradually extending over the whole body, and this may be the first evidence of the disease. The eruption consists of a number of small, round, or oval papules, pinkish in color, and may be discrete or confluent. It lasts from two to five days, when it is followed by a slight desquamation, and sometimes by a brownish staining of the skin, which disappears after a few days.

During this period there will be, in many cases, an inflamed condition of the throat, and the tonsils become swollen and painful. The inflammation is superficial, and not attended by sloughing. Sometimes a bronchial cough attends this stage. Though

there is glandular enlargement, there is never suppuration. The disease passes through its various stages to a favorable close without serious complications or sequelæ.

Diagnosis.—The diagnosis is made from measles by its less severe onset, the absence of catarrhal symptoms, the more pinkish or rose color of the eruption, and early enlargement of the cervical lymphatics; from scarlet fever, by the slight fever, the absence of the strawberry tongue, no vomiting, and the more pronounced erythema of the latter.

The **Prognosis** is favorable.

Treatment.—This is very simple; aconite and phytolacca being almost a specific, the one correcting the fever, the other influencing the lymphatic system. Where there is nervous irritation, or where there is a burning sensation attending the eruption, rhus tox. may be substituted for the phytolacca, or, what is still better, used in alternation with it. The patient may be sponged with warm water, and when there is much puritis, use the bacon rind as a means of inunction. The patient should also be anointed while desquamation takes place.

PAROTITIS.

Synonyms.—Mumps; Epidemic Parotitis.

Definition.—An acute, infectious, and contagious disease, characterized by an inflammation of one or both parotid glands, rarely terminating in suppuration, a tendency to metastasis to the testicle in the male, and the ovaries and mammary glands in the female. This is not to be confused with a metastatic parotitis which sometimes follows or accompanies such infectious fevers as dysentery, diphtheria, and other low-grade fevers.

Etiology.—The specific cause is a contagion generated during the course of the disease, but, like that of the eruptive fevers, its exact nature is not known. Bacteriologists have as yet failed to isolate a specific microbe which will of itself produce the disease. All that is necessary for one to contract the disease, is to come in contact with the breath of the afflicted person, the excretions, especially the salivary secretions, or even the apartments occupied by the patient.

One attack secures immunity from a subsequent one, though single mumps will not prevent the opposite gland from suffering subsequently if exposed to the contagion. While it may be endemic in large cities, it nearly always prevails as an epidemic, affecting children in preference to adults, though the latter are not exempt. It prevails more extensively in the spring and fall months.

Pathology.—Trousseau claims that the lesion does not proceed beyond an exalted hyperemia and congestion, while Virchow believes that there is a catarrhal inflammation of the ducts of the glands. Certain it is that the changes, whatever they may be, are of such a slight character that suppuration rarely occurs. The gland becomes swollen and hard; but after a few days it subsides, resolution being complete.

Symptoms.—Occasionally the patient will complain of feeling ill for a day or two before the development of the disease. The head, and back ache, the appetite is impaired, the bowels are constipated, and there is an unpleasant taste in the mouth.

The period of incubation is from ten days to three weeks, during which time there are rarely any symptoms which would indicate the coming trouble. Usually there is a slight chill, followed by more or less febrile reaction, and with the development of the fever the swelling of the parotid gland is first noticed. The child complains of pain just below the ear, especially when it opens or closes the mouth.

In some cases the chill and fever will be so slightly marked that the patient does not call attention to it. In others, every symptom will be marked and severe, and the patient may have a high fever for a week. The swelling may be confined to one side and run its course without the other gland being at all affected, and then it is said that the person has had single mumps. In this case he will be liable to a second attack, the other gland being affected.

There are not only the usual symptoms—pain, heat, redness, and swelling, all being marked—but we have, in addition, a peculiar nasal voice and considerable difficulty in deglutition. Any pungent substance taken into the mouth will cause pain, and it is generally suggested to the patient to try a pickle. The sourness usually causes some pain in the parotids, and the patient finds that he can hardly swallow or move his jaw. The disease

runs its course in from four to eight days; the fever first declines, and then swelling gradually passes away. (Scudder.)

Complications and Sequelæ.—As a rule, mumps is an innocent affair, running its course without any danger, though in rare cases very serious complications may arise. The most frequent is orchitis in the male, and mastitis, ovaritis, or vulvovaginitis in the female. As the swelling begins to subside in the parotid, the patient experiences a sharp pain in the newly affected organ, and in a few hours the swelling has increased and an inflammation has set up with all the intensity manifested at the original seat. It may result in suppuration or terminate in resolution. Like orchitis from gonorrhea, it has no regular course, and may terminate in three or four days, or run for ten or more days.

The most serious complications are the cerebral affections. Where the fever has run a very high course attended by delirium, meningitis has followed. Hemiplegia has also occurred. Otitis media, followed by deafness, has been recorded. The eye is not often affected, though atrophy of the optic nerve has been noted. Arthritis, albuminuria, and endocarditis have each been noticed.

Diagnosis.—The diagnosis is very easily made. The location of the swelling, in front and below the ear, with pain on moving the jaws, especially when any pungent substance is eaten, proves the character of the disease.

Prognosis.—The prognosis is always favorable.

Treatment.—This is simple but effectual. We put our patient upon aconite five drops, phytolacca ten to twenty drops, water four ounces, teaspoonful every hour. If there be a burning sensation experienced, and the child be restless and cries out in its sleep, the pulse sharp, and the tongue shows elevation of the papilla, rhus tox., five to ten drops, will replace the phytolacca.

Where the fever is intense, and there is danger from cerebral complications, put the patient on gelsemium, ten to thirty drops to four ounces of water, and give teaspoonful every hour, at the same time sponging the head with hot water. Where there is much muscular pain, give macrotys.

Locally the gland may be covered with cotton wadding, over which is placed oil silk, or cloths wrung out of hot water may be applied. Some prefer a lotion of phytolacca and echinacea.

Where the testicle is involved, strap the gland firmly upon the abdomen, and continue the internal treatment used for parotitis. The bowels should be kept open and the patient placed upon a fluid diet, preferably milk. During convalescence, care should be taken that the patient does not expose himself, thereby lessening the chances for metastatic changes.

PERTUSSIS.

Synonyms.—Whooping-cough; Tussis Convulsiva.

Definition.—A specific infectious disease occurring epidemically, and characterized by a peculiar, spasmodic, paroxysmal cough, ending in a whoop. The whoop is caused by the air rushing through the contracted larynx during a prolonged inspiration which follows a paroxysm of coughing, the air in the lung being completely exhausted by the effort. The disease usually attacks children under ten years of age, though no age is exempt. It is also characterized by catarrh of the respiratory tract.

Etiology.—The cause of whooping-cough has always been a matter of conjecture, and various theories have been assigned to account for the lesion. Some have regarded it as a laryngitis, others as a bronchitis.

Friedleben believed that the pressure of the swollen tracheal and bronchial glands upon the filaments of the pneumogastric nerve gave rise to the disease. Baginsky showed by experiment that the superior laryngeal nerve is the nerve that excites cough, and as the posterior laryngeal wall, just below the vocal cords, was supplied by this nerve, an inflammation of the larynx would give rise to a spasmodic cough. Many others contend that the disease is purely a neurosis, and that the toxin, whatever it may be, spends its force upon the medulla, pneumogastric, phrenic, recurrent laryngeal, or sympathetic nerves.

The general belief at present is, that, like other contagious diseases, it is caused by a specific germ, and many observers have been diligently working to isolate it. Afanassieff and Koplic have found what they believe to be the specific germ. Afanassieff termed it the *bacillus tussis convulsivæ*. Koplic has more recently isolated a bacillus which very much resembles the one found by Afanassieff, yet differing in some respects, and this he claims to

be the genuine article; nevertheless all have failed when brought to the crucial test, and we are still in the dark as to the exact germ.

All we know is, that it is a specific contagion, and that the unprotected, coming in contact with a person suffering with the disease or entering a room where a patient has been staying, will contract the disease.

It occurs as an epidemic, though it is more likely to be endemic in all large cities. Spring and fall are the most favorable seasons for the disease. One attack secures an immunity from the disease. While it prevails largely in children under ten years of age, I have seen it with all its severity in an old man past seventy.

Pathology.—There is no lesion which can be said to be characteristic of whooping-cough in an uncomplicated form. In the early stage there is slight catarrh of the nose and pharynx, which may extend to the larynx, trachea, bronchi, and lungs. In the advanced stage, especially in delicate children, we may find more decided pulmonary changes, such as emphysema, broncho-pneumonia, pulmonary collapse, and great congestion of the lungs; but these anatomic changes are the results of complications, and not characteristic of the disease.

Symptoms.—Authors have divided the disease into three stages following the period of incubation, though they are not always well defined. They are,—(1) The catarrhal stage; (2) The spasmodic stage; (3) The stage of decline.

The period of incubation varies from a few days to two weeks, depending largely upon the susceptibility of the patient, the virulence of the epidemic, and the resisting power of the child, or upon his vitality. This period comes on so insidiously that the prodromal symptoms are ill defined, and the first evidence of the disease is the catarrhal stage.

The child appears to have taken cold. There is some irritation of the Schneiderian membrane, with increased secretion from the same, and also increased secretion of tears, with more or less hoarseness. The cough, even in the early stage, is suggestive, coming on in paroxysms, though at this time the characteristic whoop is absent. The patient at this period is considered by the mother to have taken cold, and the favorite cough mixture is prescribed; this failing, the physician is consulted, who many times makes the same mistake, only to be discovered when the whoop develops.

The patient now begins the cough with a full inspiration, and continues it till the air is entirely expelled from the lung and the child is completely exhausted. The paroxysm is made up of a series of sharp, hard, exasperating, and explosive coughs, and during its continuance the patient presents to the anxious mother an alarming and frightful appearance.

As the cough progresses, the child becomes red in the face, the color soon changing to a livid or purplish hue; as the violence increases, the eyes seem as though bursting from their position, the lips become swollen, the veins of the neck become distended, and sometimes blood bursts from the nose, mouth, and even the eyes or ears. A glairy, tenacious mucus is expelled as the result of the severe coughing, and frequently vomiting ensues, especially if a paroxysm of coughing comes on soon after taking nourishment.

During this time there is a spasmodic closure of the glottis, and when the paroxysm is over, the child gasps for breath, and the air, rushing through the contracted larynx, gives rise to the whoop. If the paroxysm has been very severe, the child is limp and exhausted for some moments; at other times he resumes the play, interrupted by the fit of coughing, as though the attack was of no importance.

There may be only three or four attacks in twenty-four hours, or they may occur as often as every thirty or sixty minutes.

If the chest be examined during an attack, we will find dullness during expiration, and resonance full and clear during inspiration. The respiratory murmur is, however, indistinct or absent, owing to the small amount of air passing through the contracted glottis. During the intervals of the paroxysms, various sounds are heard, depending upon the complication. This stage continues from two to four weeks, when the stage of decline follows. There is nothing peculiar to this stage, simply a gradual subsidence of the preceding symptoms.

The paroxysms are increased by exciting the emotions, fits of crying almost invariably bringing on an attack. The inhalation of any irritant will also prove an excitant.

Complications.—The complications are numerous, and give, to an otherwise harmless disease, a degree of danger. A common, though not dangerous, complication is hemorrhage, which may be from the nose or the lung.

Vomiting may be frequent, and at times so severe as to give rise to gastric derangement, resulting in anemia or general marasmus. Ulceration of the frenum linguæ is quite common.

The more serious complications, however, are those of the respiratory and circulatory apparatus. As a result of a severe paroxysm of coughing, there may be a rupture of the pulmonary alveoli, giving rise to interstitial emphysema. Broncho-pneumonia, so often attended by collapse, is one of the most serious and fatal results. Enlargement of the bronchial glands often occurs, and, when the patient is delicate or bottle-fed, may lead to tuberculosis. As a result of the great strain upon the heart, valvular troubles are not uncommon. Convulsions are not frequent, though occasionally seen.

Diagnosis.—The diagnosis is readily made after the characteristic whoop develops; before this we may not be positive, although the catarrhal symptoms, hoarseness and spasmodic cough, are suggestive of the trouble.

Prognosis.—Although this affection has been regarded as one of the fatal diseases, Dolan ranking it third in fatality in children's diseases in England, I have never been able to understand the large mortality attributed to it, and an experience of nearly twenty-five years bears me out in saying that the prognosis should nearly always be favorable.

In very young, bottle-fed, delicate babies, with pulmonary complications, the prognosis should be guarded, otherwise it is favorable.

Treatment.—While I do not claim that we have a specific treatment for this troublesome affection, I do claim that the cough can be so modified and the disease so controlled that the mortality will be very small. Belladonna, given in small doses, is one of our best remedies; add five to ten drops of the specific tincture to half a glass of water, and give a teaspoonful every one, two, or three hours. Our "regular" brother is beginning to recognize its value, for Jacobi regards it as the most satisfactory remedy for this disease. The indications are the same as in other troubles,—dullness, with capillary congestion.

Drosera is called for when the child is hoarse and the cough croupal in character. Bromide of ammonium, where the most marked symptom is the convulsion or spasmodic character of the

cough. Dr. Webster speaks very highly of magnesium phosphate 3x. An infusion of red clover blossoms, recently cured, to which may be added simple syrup, is an old domestic remedy of much virtue. Burning a little sulphur in the sleeping-room before putting the child to bed will often insure a good night's rest.

Dr. W. P. Best, of Indianapolis, presented a paper on "Solanum in Whooping-cough" at our National Medical Association, giving his experience with this drug. So favorably was he impressed with the drug, that he sent me a trial bottle. After using it in a number of cases, I am convinced that in solanum we have almost a specific for this troublesome disease.

Bromoform, in from one to five minims suspended in syrup, has recently been highly recommended, though in my hands it has not been as successful as the above described remedies. Inhalations sometimes afford relief.

During convalescence the child should be carefully watched, as it is at this time pulmonary complications are so liable to occur. If the child be delicate and the parents be able to profit by the prescription, a change of climate affords great benefit during the stage of convalescence.

DIPHTHERIA.

Synonyms.—Diphtheritis; Angina Maligna; Membranous Croup.

Definition.—An acute infectious disease characterized by a grayish-white, fibrinous exudate, usually located upon the tonsils or neighboring tissues, though it may occur upon any abraded surface; the frequent involvement of the upper air-passages, and a toxemia that is attended by severe prostration; paralysis of certain organs and muscles, together with cardiac weakness.

History.—Diphtheria is one of the most greatly feared, most fatal, and most common diseases of childhood. Its history antedates the Christian Era by more than a hundred years; for Asclepiades performed laryngotomy for respiratory obstruction, and it is therefore probable that he treated croup and diphtheria; while Aretæus, a Greek physician of Cappadocia, whose writings are still extant, accurately describes diphtheria when he says,

"The tonsils are covered with a white, livid, or black concrete product," and adds, if it invades the chest by the trachea, it causes suffocation the same day.

Galen, during the second century, undoubtedly referred to diphtheria when he described a "fatal disease then prevailing, where the patient expelled a membranous tunic by coughing or spitting." Aëtius, in the fifth century, describes a disease of the throat where the ulceration had a peculiar white, ashy, or rusty color. This undoubtedly was the same dread disease.

From the fifth to the sixteenth century there is no record of the disease; but it is not at all likely that the disease had disappeared from the world, but that the medical writings of the Dark Ages suffered the same as general literature, and the disease most likely appeared during these centuries the same as before and since, numbering its victims by the thousands.

During the sixteenth century epidemics prevailed in various parts of Europe, and the disease has steadily kept pace with the intervening centuries, so that we enter the twentieth century with the dread scourge more thoroughly entrenched in all large cities than it has ever been. This is a sad confession for the medical world to make, when we remember that, during the last twenty-five years, this disease has been studied more, discussed in medical societies more frequently, and has formed a topic for innumerable journal articles; and yet, notwithstanding these facts, and the great advance made in sanitary methods, there are more deaths recorded to-day from diphtheria than from any other contagious disease. The disease has prevailed in this country ever since its first appearance in Boston, 1638.

Etiology.—The disease usually prevails epidemically, though in all large cities it is endemic. The force of the contagion varies in different epidemics; but, taken as a whole, I am inclined to believe that it is less contagious than scarlet fever. The last thirty years has witnessed greater search for the causal agent than all previous years combined.

Dr. Pruden and others, after careful investigation in a series of cases, came to the conclusion that a streptococcus, which is always present in the membranous exudate, was the causal agent. Dr. W. W. Taylor presented to the London Epidemiological Society the history of a number of cases, to prove that common mold was the causal agent. Others have tried to prove that sewer-gas

was a prime factor in producing the disease. Each investigator showed an array of cases to prove his position, yet each and all fail to prove that every case can be traced to the causal agent.

Since 1868, when Oertel discovered micrococci in the pseudo-membrane, bacteriologists have been trying to separate the special bacillus which will invariably produce the disease. While it might be interesting to some to trace the work of such investigators as Oertel, Cohn, Klebs, Loeffler, Roux, Yersin, and a host of others, space forbids. Suffice it to say that from out of the great mass of investigations there has been evolved the Klebs-Loeffler bacillus as the causal agent. This is the generally accepted micro-organism which is responsible for diphtheria.

Yet there is ground for much difference of opinion as to the reliability of this germ as the causal agent. First, it is found in other diseases of the mouth and pharynx. Again, it is sometimes found in the healthy mouth and the mucous surfaces of the throat and nose, and finally it is sometimes absent in well-known cases of diphtheria; but in order to prove that this special bacillus is the cause, all cases showing an absence of this germ are denominated false diphtheria, or diphtheroid angina. Hence we divide the bacilli into two classes,—the Klebs-Loeffler bacillus of true diphtheria, and Hoffman's bacillus, or the pseudo diphtheria bacillus, or bacillus xerosis. (See frontispiece.)

We are inclined to believe that the specific cause has not yet been determined. That it is a specific poison is undoubtedly true, and whether it resides in sewer-gas, common mold, or in whatever form or place, all that is necessary is for the poison to come in contact with the individual.

The toxin may so influence the blood that we see the systemic effect first, and the local lesion follows, or, as Dr. Scudder said in 1861: "I hold diphtheria to be a general as well as a local disease, as is proven by the languor, listlessness, torpor of the nervous system, and derangement of the excretory organs, which, as a general rule, precede all local disease; all being symptoms of perversion of the blood, and almost invariably indicating the establishment of febrile reaction. We also find the evidence of the perversion of the blood in the heavily coated tongue, which is always more or less discolored at the commencement of the disease, and always, in severe cases, exhibiting the brownish tinge,

with more or less sordes upon the teeth as the disease progresses in the diphtheritic deposit, which is markedly different from the exudations from highly vitalized blood; in the secretions, the urine in severe cases being abundant, in all cases discolored frothy, more or less clouded, with a peculiar, somewhat cadaverous odor—what the ancients would have termed *illy concocted* in the evacuations from the bowels, obtained by cathartics, which are frequently large, dark, and almost invariably fetid; and especially in the condition of the blood itself, when the disease has attained its maximum, which is dark, is not changed by exposure to air; forms a loose and easily broken coagulum, or does not coagulate at all.

“Post-mortem examination in those cases that have run a regular course—i. e.; that have not been terminated by an extension of the disease to the larynx—shows us the blood broken down to a considerable extent, more or less discoloration of tissues from extravasation of the coloring matter, and softening of the tissues. These facts, it appears to me, prove conclusively the opinion given above.”

Diphtheria in the Lower Animals.—It is now generally admitted that the lower animals may become infected, and they, in turn, communicate the same to others. Especially is this true of fowls and the common domestic animals, cats and rabbits. Pigeons and domestic fowls are perhaps more frequently affected than all others.

In Keating's *Encyclopedia of the Diseases of Children*, Lewis Smith gives an account of an epidemic of diphtheria communicated from diseased turkeys, which would seem quite convincing. The author says: “On the Island of Skiathos, off the northeast coast of Greece, no diphtheria had occurred during at least thirty years previous to 1884, according to Dr. Bild, a medical practitioner of the island. In that year a dozen turkeys were introduced from Salonica. Two of them were sick at the time, and died soon afterwards. The others became affected subsequently, and of the whole number seven died, three recovered and two were sick at the time of the inquiry. The two had a pseudo-membrane upon the larynx, difficult breathing, and swelling of the glands of the neck. As further evidence that the disease was true diphtheria, one of the turkeys, which had survived, had paralysis of the feet. The turkeys were in a garden on

north side of the town, and the prevailing winds on the island are from the north. While this sickness was occurring among the turkeys, an epidemic of diphtheria commenced in the houses in proximity to the garden, and spread through the town. It lasted five months, and of one hundred and twenty-five cases in a population of four thousand, thirty-six died. Diphtheria from this time was established upon the island, and frequent epidemics of it have occurred since."

Predisposing Factors are age, season, climate, and unhygienic conditions.

Age.—Diphtheria is essentially a disease of childhood, though no age is exempt. The ages most susceptible are those between two and eight years, the receptivity diminishing each year thereafter. During the first year of life it is also infrequent, most likely owing to lack of exposure in the very young. One attack does not render the patient immune.

While elderly people are not so liable to the disease, physicians and nurses should be very careful while examining or treating the throat; for in the struggle of the child a portion of the membrane may be forcibly thrown into the face and eyes of the attendant during a fit of coughing.

Season.—It prevails more extensively during the winter and spring months.

Climate.—The disease occurs more frequently in cold and temperate climates than in the tropics. Moisture favors the propagation of all germs; hence damp cellars, where mold collects, favors the spread of the disease.

Unhygienic Conditions.—Poor sanitary conditions lower the vitality and resisting power of the individual; hence render one more susceptible to the poison. Germs of all kinds thrive in filth; therefore decaying organic material, defective drainage and sewage, cesspools, etc., favor not only the propagation of diphtheritic germs, but those likewise of all the infectious fevers. It is true that persons living with the most perfect sanitary conditions are victims of infectious diseases, but this is due to the non-resisting power of the individual to the germ or poison.

Pathology.—Diphtheria being a general as well as local disease, presents pathological features of each.

Local.—The peculiar characteristic pathological feature of diphtheria is the formation of a fibrinous exudate, varying in size

and consistency, and locating generally in the throat and near neighborhood. Usually the tonsils and uvula are covered with this exudate, but it may extend in every direction, the entire fauces, the cheeks, the nares, and, passing deeper, the Eustachian tube and middle ear on the one hand, or the nasal duct and conjunctiva on the other, while the respiratory tract may receive the brunt of the attack, and a complete cast of the larynx follow.

In one of my cases, after expelling the membrane from the larynx, the flapping of the loosened membrane could be distinctly heard in the bronchi upon auscultation. Others have reported the extension of this exudate through the entire digestive tract, while Smith records the passing of a false membrane from the lower bowel, a foot in length. In the female it may involve the vagina and even the uterus; in the male it has formed on the prepuce. Thus we see that any mucous surface, upon injury or severe irritation, may show the characteristic exudate.

In mild cases this exudate may be thin and superficial, and easily removed, involving only the epithelial layer and superficial mucous surfaces, the neighboring tissues showing a swollen and hyperemic condition; within forty-eight hours the membrane slips off, leaving a slight ulcerative surface. In this case the external appearance is more cleanly looking, being of a whitish gray color.

In the severer cases, the exudate is thicker, more dense, and is firmly adherent in the tissues, like the glass in a watch-case. It is ashy gray in color at first, soon changing to a dirty brownish color as necrosis proceeds. Beneath and around the membrane there is hyperemia, and the inflamed condition of the tissues results in the discharge of a purulent material. The deeper tissues are infiltrated, and frequently extensive sloughing follows the removal of the exudate.

The pseudo-membrane is composed of fibrin, necrosed epithelium, pus, broken-down leukocytes, blood-disks, and bacilli of various kinds, of which the Klebs-Loeffler predominate. The blood-vessels beneath the membrane are congested, and the lymph channels are dilated and filled with fibrous fluid.

The necrosis may be confined to the epithelium, in which case there is but little tissue change; but if the deeper connective tissues are involved, there may be extensive destruction of tissue, including blood-vessels. When the membrane in the larynx and bronchi is thick and tenacious, complete casts may be expelled.

Heart.—Among the most important lesions in severe diphtheria are those that affect the heart. There may be parenchymatous degeneration in the less severe form, while fatty degeneration occurs in the severe case. One or both ventricles may be dilated. The walls of the heart are often flabby, while interstitial myocarditis is not uncommon; a rarer lesion is endocarditis and pericarditis.

Kidneys.—In the severer cases of diphtheria there is nearly always more or less acute nephritis, and a cut surface reveals the process of degeneration. The kidneys are usually enlarged. The urine is generally rich in albumen, casts, epithelium, and leukocytes.

Spleen.—In most diseases where there is toxemia, we find enlargement of the spleen, and this disease is no exception. There is also degeneration of its tissues. The lymphatic glands of the neck are frequently swollen and more rarely hemorrhagic, while suppuration may take place, though not common.

Nervous System.—J. G. Thomas reported in the *Boston Medical Journal*, February, 1898, the lesions produced by diphtheritic toxin, as follows: 1. A parenchymatous degeneration of the peripheral nerves, and at times an interstitial process is added to the degenerative one, accompanied by hyperemia and hemorrhages. 2. Acute parenchymatous and interstitial degeneration in the muscles, especially the heart muscles. 3. Only slight changes in the nerve cells. 4. In rare cases a hyperemia, infiltration or hemorrhage into the brain or cord sufficient to produce permanent troubles, as hemiplegia and multiple sclerosis.

Blood.—The blood is more or less broken down, the fibrin is deficient, and the tissues are usually stained by extravasation of blood. Leukocytosis is generally pronounced, the increase of leukocytes beginning a few hours after infection.

Symptoms.—The symptoms will depend upon the character of the epidemic, the parts affected, and the complications. We shall not attempt, however, to classify and describe, as separate forms, nasal, pharyngeal, tonsillar, laryngeal, etc., believing that, when these different parts are involved, they are simply extensions of the general disease, and do not need a special classification and description, but will treat them as they occur.

Incubation.—This stage varies from two days to two weeks, depending largely upon the character of the infection and the

manner of receiving the same. If by inoculation, from twelve to twenty-four hours may constitute the incubating period, and when the infectious material is very intense, as in the malignant form, the period is also short, from two to four days. The symptoms during this period are not characteristic nor constant, but might be taken for the forming stage of any of the infectious fevers.

Generally the patient is listless and languid, complains of feeling tired, and is not interested in his play; is fretful and restless at night; eats but little, but calls for water frequently, being thirsty; the breath is usually offensive, and the tongue is coated with a moist, dirty fur; the patient may complain of being chilly and of pain in head, back, and limbs. These prodromal symptoms may culminate in a chill, to be followed by fever of varying intensity.

In some the thermometer alone reveals the increase in temperature, while in others the fever is active throughout the course of the disease. The secretions from the skin, kidneys, and bowels are more or less arrested, while albumen is generally found in the urine. As the disease progresses, the fever assumes an asthenic form, and the blood shows the presence of the septic poison by the dirty tongue, fetor, and condition of the mucous surfaces.

The local phase of the disease is shown very early by pain in deglutition, though, in rare cases, the patient experiences no pain, although inspection reveals an alarming condition. There is usually dryness, the patient swallowing frequently to moisten the throat. On inspection we note that the mucous surface of the fauces, tonsils, and pharynx are reddened and swollen, upon which the characteristic ashen gray exudate appears. Sometimes the throat presents a livid appearance, revealing the malignant character of the attack.

The exudate first appears in small patches about the size of a wheat kernel, but soon coalesces into one or more large patches or mass. The exudate, at first superficial, soon dips into the deeper tissues, and presents a characteristic appearance, imbedded like the crystal in a watch; the exudate can not be wiped off like an ulcerated surface, but firmly adheres, and, when forcibly removed, leaves a raw and bleeding surface.

"For two or three days, in the majority of cases, the throat is dry; sometimes, indeed, during the entire progress of the disease. Then secretion is established from the mucous follicles,

and, some patches of exudation being removed, there is a free secretion from the denuded surface. The salivary glands also become more active, and the saliva is thick, tenacious, and ropy; and altogether the secretion is large, and requires frequent efforts at removal. Occasionally cases present themselves in which this seems to be the most unpleasant symptom.

"In the latter stages of the disease we may distinguish two classes of cases. In the first the dryness continues, and the parts become stiff and immobile, so that, after a time, deglutition becomes almost impossible, and respiration is rendered very difficult and labored. Extending upward to the posterior nares and nasal cavities, these are closed by the swelling; and descending to the inferior portion of the pharynx and epiglottis, these and associated parts are swollen and rendered incapable of motion, and the patient dies, partly from want of food and drink, and partly from imperfect aeration of the blood.

"In the second class of cases, secretion commences about the second or third day. By the fifth day it is quite free, some portions of the exudation are being detached, and the exposed surface secretes pus. In very severe cases this ulceration progresses in every direction, but is mostly superficial. The tissues seem to have lost their vitality, and the muscles their power of contraction, and they hang feeble and pendulous, and infiltrated with serum where the connective tissue is loose. Thus we have paralysis of the throat in the second as well as the first case."

Malignant Diphtheria.—Some seasons the diphtheritic virus possesses a virulence entirely unaccountable. The patient seems stricken with such force that the resisting power of the system is unable to cope with its unequal foe. The patient is dull and listless; the face is a dusky hue; the tongue thick, flabby, and covered with a dirty, pasty coating, or it is dry, brown, and parched; the fever is quite active, the temperature reaching 103° to 104° , or even 105° . The pulse, however, is small, though rapid, showing marked enfeeblement of the heart. In nervous children, vomiting, followed by convulsions, may usher in the disease. The urine is scanty and often loaded with albumen.

The local affection is seen very early; the tissues of the throat are dusky and swollen; the tonsils enlarge, and, with the edematous condition of the uvula, the throat is discolored and the exudate that swallowing is exceedingly difficult, painfully made; yet the

prostration, feeble pulse, and presence of albumen, even though we failed to get a history of the presence of the membrane, would be very suggestive of diphtheria.

Just here we desire to say a word as to the identity of diphtheria and membranous croup. We take the ground that they are distinct and separate diseases, though we have laryngeal diphtheria. Membranous croup comes on more or less suddenly, does not prostrate the patient as does diphtheria, there is but little evidence of sepsis, no fetor, and the patient succumbs, not to systematic poisoning, but from asphyxia.

Prognosis.—The prognosis depends upon several conditions, such as the character of the epidemic, the complications, and the age of the patient. Some years the disease appears in a mild form, and nearly all cases yield to treatment, while at other times such a malignancy attends the disease that but few recover. In 1883 I received a letter from a physician in Dakota, asking for help in the treatment of diphtheria. He wrote, "Nearly every one that contracts the disease dies, no matter what school treats them."

When the local disease extends from tonsils to uvula, to the nares and to the larynx, these are always serious, and the prognosis should be guarded. Age also figures in the prognosis; for the younger the patient, the more likely to a fatal termination. If there is broncho-pneumonia, the danger is increased. Then the tendency to paralysis after the grave symptoms disappear makes this one of the most treacherous of all diseases, and therefore, unless of a mild type, we should be guarded in our prognosis.

Treatment.—As soon as the diagnosis is made, the patient should at once be isolated, the preparation of the room being the same as for any infectious disease; viz., the removal of all unnecessary furnishings, such as carpet, draperies, etc. Where possible, the room selected should be large, with exposure to the sun, and well ventilated. All discharges from nose and mouth should be received on cloths and burned.

Where possible, a nurse should be employed and kept away from the other members of the family. The physician should be especially careful, when inspecting the throat, not to receive any of the discharges from the mouth of the patient during a paroxysm of coughing, which often occurs when the tongue is depressed

and the doctor is making his examination. As soon as the patient is convalescent, the room should be thoroughly disinfected.

The medical treatment will consist of both local and systemic measures. Internally, if the temperature is high, with small, quick pulse, give aconite five drops to water four ounces. I am aware that there is an idea prevalent among a great many that aconite should not be given in diphtheria, it being a depressant, but an experience of twenty-five years in the use of this remedy does not justify the impression. If the small dose be used, I am satisfied that it is beneficial. To this we add phytolacca, fifteen to twenty drops, when the glands of the neck are swollen or where there is congestion of the tonsils.

If there be a foul odor, alternate baptisia with the former remedies. If the tissues are full and bluish, give echinacea one drachm to water four ounces. This is one of our best remedies, a good antiseptic and sedative combined. Where the breath is bad, that peculiar stench so often found, I find nothing equal to potassium chlorate and phosphate of hydrastine. This is another agent which is given credit for giving rise to nephritis, but years of experience in its use does not bear this out; perhaps the hydrastine overcomes this tendency. I am sure that the following is one of our best combinations: potassium chlorate, one drachm; hydrastine, five grains; water, four ounces; a teaspoonful every one or two hours. If the patient is old enough, have him gargle with a solution of the same strength. If the tongue and mouth become dry and brown, give hydrochloric acid ten to twenty drops, simple syrup, and water, of each two ounces; a teaspoonful every one, two, or three hours.

To keep the throat as clear as possible use a gargle of potassium chlorate and hydrastine or salicylic acid and borax; of the latter each ten grains, to water four ounces, or a spray of three per cent solution of pyrozone. In malignant cases, threatened with heart-failure, Dr. Webster speaks highly of lachesis. Where the nose is obstructed by the exudate, and a sanious discharge is excoriating the lip, the nasal toilet is especially beneficial. Unfortunately these cases are found mostly in children, and it is impossible to spray or cleanse the nose.

Where the larynx is involved, the use of inhalations will give the best results. With the first croupal symptom place a quart of boiling water in a vessel, and add a cup of cider-vinegar and a

handful of hops; place this over a burner near the bed, and, by means of a tube, convey the steam directly to the child's face, so that the inhalation may be constant. This will soften and loosen the membrane. Now give nitrate of sanguinary 2x or 3x every hour, and the membrane will be expectorated in small particles or in long shreds. Inhalations of steam from boiling water is highly recommended. A cold pack to the throat may give some relief when the patient is suffering pain.

Serum Therapy.—The last few years have found many advocating the use of antitoxin. Statistics, both pro and con, have been offered to prove both its usefulness and also its danger. That harm has followed its use, none will deny; yet many able men claim good results for the serum treatment. Personally, I have not been successful in its use, and believe that the treatment above outlined will give by far the best results.

The diet should be fluid in character, milk being preferable. The child should be carefully watched during the convalescence for signs of heart-failure, and with the first evidence, put the child to bed and give cactus, digitalis, or kindred remedies.

INFLUENZA.

Synonyms.—Epidemic Catarrhal Fever; La Grippe.

Definition.—An acute infectious disease, the contagiousness of which is questionable, protean in character, but affecting more constantly the respiratory apparatus and nervous system, attended by great prostration and occurring epidemically and pandemically. Following a general epidemic it occurs sporadically for one, two, or three years.

History.—While it is very likely that the disease has existed for ages, and that the epidemic which raged among the Greek soldiers at the siege of Syracuse, 395 B. C., was influenza, and that the epidemics of 827, 888, 896, 927, and 996 were of the same character, the authentic historical accounts date, according to Hirsh, to an epidemic which prevailed in Italy, Germany, and England during the month of December, 1173. Even this and the epidemics of 1293, 1323, and 1387 are considered unreliable by most medical writers, who date the first reliable account to

the epidemic or rather pandemic of 1510, which visited Spain, Italy, Hungary, Germany, France, and England.

Since this historic date, the disease, at intervals of a few years has swept over countries with a rapidity unknown to any other affection.

Since 1655, repeated epidemics have occurred in our own country, the last (1889-90) being the greatest pandemic that ever swept the earth. Beginning in Bokhara, in Southern Russia, it crossed the great Russian Empire, spread over Germany, invaded England and France, and in less than six months had made the circuit of the globe.

Its force is irresistible, and it spares neither age, sex, nor condition. The millionaire and the pauper stand helpless before this Nemesis. Fortunately, unless severe complications arise or the treatment be too heroic, the mortality is small.

Etiology.—To what extent meteorological conditions figure as a causal agent, we are unable to state, and while damp, cold, foggy weather may present conditions that are favorable to the generation and the propagation of the poison, it is not likely that it produces the primary toxin.

In 1892, Pfeiffer, at the Hygienic Institute of Berlin, discovered in the sputum of influenza patients a bacillus which was characteristic, and which he separated and cultivated, a culture of which injected into rabbits gave rise to influenza. Kitasato and others confirm the discovery, and claim that this specific germ is not found in any other disease, and those who believe in the microbic theory consider the bacillus of Pfeiffer the causal agent.

The method of entrance into the system is most likely by way of the respiratory apparatus, and the rapidity with which it travels and the great number attacked, irrespective of contact with each other, warrants this position.

The scourge usually lasts from four to seven weeks. One attack does not render a person immune, and a second or third attack is common. The exhaustion that attends the disease renders the system susceptible to the influence of any and every toxin, and the sequelæ of grip are legion.

Pathology.—There are no characteristic anatomical lesions in a case of uncomplicated influenza. Where the disease has continued for some time, the mucous membrane of the air-passages

will be found congested and bathed with a catarrhal secretion. The gastro-intestinal tract will be similarly affected. Where death ensues, it is generally the result of some complication.

Pneumonia is the most frequent and fatal complication, and may be either lobular or lobar, accompanied by the usual characteristic changes. Plastic pleurisy is often associated with pneumonia, though it may exist independently. In either case, a sero-purulent exudate will be found. Pericarditis with a like exudate is not uncommon. Nephritis complicates a certain per cent of cases, and there is no doubt but that meningitis follows the severe nervous types of the disease. In each of these, the anatomical changes peculiar to the disease take place.

Symptoms.—During an epidemic we meet with every grade of the disease; many will be so mild that the patient will not be confined to the bed, and only complains of a bad cold, while others are of a very grave character; again the complication seems to supersede the basal lesion, hence the symptoms in their entirety are legion. In order to better describe the various phenomena, we will divide the disease into three types that are usually well defined: the respiratory, the gastro-intestinal, and the nervous.

Respiratory.—The period of incubation is very short, not more than three days, and sometimes this period is not noticeable. The invasion is sudden, the patient being seized by a chill of a pronounced type, followed by febrile reaction of varying intensity. There is severe headache, and the face is flushed and hot; the prostration is marked, and the pain in back and limbs is intense; in fact, the patient aches all over. The temperature ranges from 103° to 105°. The secretions are all arrested, the skin is hot and dry, the urine is scanty and high-colored, and constipation is marked.

The catarrhal symptoms are characteristic; the eyes are suffused, and the nasal passages are congested. The pharynx is involved, and soreness of the throat is an early complaint, which, upon inspection, reveals a red, dry, swollen condition. There is constriction of the chest, and a hard bronchial cough early develops. The respiration is dry and hurried. There is general irritability, and sleep is disturbed or absent.

Within forty-eight hours expectoration begins, at first scanty, the mucus being glairy and tenacious and raised with difficulty;

as the disease progresses this becomes more profuse, is removed with less effort, the cough is easier, and the paroxysms occur at longer intervals. With the increased secretion of the mucus, the fever subsides, all the symptoms are mitigated, and the patient enters the convalescent stage from the fifth to the eighth day.

In more severe cases a severe catarrhal bronchitis develops, with the usual attendant symptoms.

One of the most frequent and severe complications of this type is pneumonia. The cough is short and hacking, the respiration labored and oppressed, and the patient presents an anxious appearance. If the pleura be also involved, a sharp lancinating pain accompanies the cough. The sputum assumes the characteristic rusty form, the crepitant and subcrepitant rales develop, there is dullness on percussion, and the dusky hue of the face speaks of imperfect aeration of the blood, and the patient has to be propped up in bed to assist the inspiratory muscles in filling the lungs. The symptoms are so pronounced that the case can not be mistaken.

Heart-failure may occur in this type, though very rare, unless depressants, like the coal-tar products, have been used.

Gastro-Intestinal.—In some the stomach and bowels appear to receive the force of the infection, there being nausea and vomiting, together with diarrhea. This type was noticed quite frequently in 1891. The diarrhea was dysenteric in character, there being a great deal of tenesmus and pain. With this type the catarrhal symptoms were slight, and might be overlooked. Children were more affected with this form than adults.

Nervous.—This type is especially severe in persons of nervous and excitable temperaments. The headache is intense, the patient is restless and irritable, the eyes are bright, the pupils contracted, and delirium is often present. The fever is acute, the temperature being 104° or 105° . In the severer forms a meningitis develops, with the usual attendant symptoms. In all these forms the fever is remittent in character.

Sequelæ.—There are few, if any, diseases that leave so large a train of chronic lesions in their path, the most prominent being chronic bronchitis. Asthma, laryngitis, and phthisis have more rarely followed. An enfeebled action of the heart persists for a long time, and angina pectoris occasionally follows.

Chronic catarrhal diarrhea is one of the results, while ne-

phritis and cystitis occur sufficiently often to render the victim most miserable.

The most painful sequelæ, however, are of the nervous system,—migraine of a severe and intractable character; neuralgia of various parts; insomnia, that renders the patient's life a burden, and makes him grow thin and cross and irritable; melancholy, that dread affection that robs life of its pleasures, yet makes its owner dread to lay it down; and, lastly, mania, which is worse than death,—these are a few of the results which follow influenza.

Diagnosis.—The diagnosis is easily made. The sudden invasion, the catarrhal symptoms, the hard, dry cough, intense pain in head and back, and general aching of the body, the marked prostration, are characteristic, and can hardly be mistaken.

Prognosis.—The prognosis is usually favorable, though severe complications, like pneumonia, pericarditis, or nephritis, would make the prognosis problematical, as it would in delicate children and among the very aged.

Treatment.—Our school has been successful to a remarkable degree owing to the fact that the treatment has not been routine, but each phase of the disease has been met with remedies directed to control certain conditions, rather than in treating it as a whole. Specific remedies for specific conditions have certainly been successful.

If we keep in mind the important fact that grip is depressing and rapidly exhausts vitality, it will save us from serious mistakes. First, we insist most emphatically that the patient take his bed early, and remain there until the fever has disappeared. Secondly, we avoid depressants as we would a pestilence. A depressing treatment added to depressing disease has been responsible for many deaths that have been attributed to some grave complications. With the exception of a single dose of phenacetin or antikamnia in the beginning, we discard the use of all coal-tar products.

In most cases the patient aches all over, or, as he expresses it, every bone in his body aches, and the myalgia is so great that the patient is crying for relief. In these cases, where the heart action is good, one five-grain antikamnia powder or a three-grain phenacetin powder, followed by the appropriate remedy, will relieve

the headache and the backache, and render the patient fairly comfortable within an hour. This is the extent of my use of the coal-tar products. One powder at the beginning of the disease, followed by the judicious use of the specific, will prevent a return of the severe pain. If the heart action is weak, however, it must not be used, though severe pain is nearly always accompanied by a full, bounding pulse.

Aconite.—If the pulse be small, give aconite five drops to water four ounces. Teaspoonful every hour.

Veratrum.—In the adult the pulse is usually full, strong, and bounding, with flushed face, bright eyes, and contracted pupils. Such cases need veratrum fifteen to thirty drops, and gelsemium ten to twenty drops, to water four ounces. Teaspoonful every hour, until the pulse responds to the sedative and the irritation of the nervous system subsides, when we give it every two or three hours. If the patient is restless or unable to sleep, a five-grain diaphoretic powder may be given.

Bryonia.—For the cough, which early develops, and is attended by chest-pains, bryonia five to ten drops, with the appropriate sedative, will give the best results.

Macrotys.—If there is muscular soreness, rheumatic in character, or if it be about the menstrual period, macrotys will be the better remedy.

Ipecac.—Where there is intestinal irritation, give ipecac ten drops to four ounces water, a teaspoonful every hour.

Bismuth Subgallate.—Where there is but little fever, with persistent diarrhea, subgallate of bismuthi five to ten grains, and one-eighth of a grain of opium, every four, five, or six hours, will be found efficient. Should complications arise, they will be treated according to the special condition present.

The heart should be carefully watched, and cactus, *cratægus*, *digitalis*, or *strophanthus* employed as they may be needed. These agents, however, will seldom be needed if the coal-tar products be withheld.

The diet should be light, milk in some form being preferable. The patient should not be allowed to return to his work too soon.

PNEUMONIA.—SEE RESPIRATORY DISEASES.

ERYSIPELAS.

Synonym.—St. Anthony's Fire.

Definition.—An infectious disease, characterized by an acute and specific inflammation of the skin and subcutaneous tissues, attended by a shining redness, which spreads rapidly; marked swelling and pain, and which finally terminates in desquamation. A fever of variable intensity, moderate prostration, and supposed to be caused by the streptococcus erysipelatis.

Etiology.—The cause is undoubtedly a specific toxin or germ which gains entrance into the lymph channels through an injury to the skin. Modern pathologists ascribe the cause to the streptococcus erysipelatis of Fehleisen, though this is perhaps identical with the pus-producing streptococcus. If this be true, the old division of idiopathic and traumatic erysipelas will have to be discarded; for there is undoubtedly some injury to the surface, although it may not be perceptible, whereby the infection finds entrance. This may be surgical or accidental, such as an inter-trigo or an acute pustule, or the abrasion may be within an orifice and not visible, as in the nose or mouth, or the traumatism may be of the uterus during the puerperium.

Predisposing causes are, poor hygienic surroundings, which in former times were the cause of so much erysipelas in hospitals, and following confinements. Age also predisposes to this lesion, those being the most susceptible who are between the ages of twenty and thirty. Previous attacks also render one more susceptible, thus being different from all other contagious diseases.

Pathology.—Erysipelas is a true dermatitis, involving the skin, subcutaneous, and mucous surfaces. The blood-vessels are dilated and distended with blood, and cell-infiltration may extend into the deeper tissues, where suppuration is apt to take place. The cocci are found in the lymph spaces of the affected area, while beyond this they are found in the lymph vessels, where the battle is fought and won by the leukocytes (phagocytes).

Aside from the local affection, the toxin in severe cases causes granular degeneration of the heart, kidneys, spleen, and liver. According to Osler, some of the worst cases of malignant endocarditis are secondary to erysipelas.

Symptoms.—The period of incubation is variable, it, being from three to ten days after the entrance of the infection before

the development of the disease. The prodromal symptoms are common to inflammations generally; viz., headache, loss of appetite, furred tongue, partial arrest of the secretions. These terminate in the chill in the adult, or more likely in a convulsion, if the patient be a child. Following the chill, reaction occurs, with rapid rise in temperature, the thermometer registering 103° the first day, 104° the second, and 105° to 106° by the third or fourth day, usually the days of greatest intensity. The pulse is full and bounding, the tongue is coated with a dirty fur, or it is brown and dry. The skin is dry and more or less constricted, the urine is scanty and high colored, and the bowels are constipated.

The local affection begins with a bright-red spot, slightly raised, more or less edematous, and with a tendency to spread rapidly. The part is hot, swollen, and painful, and often slight blisters form upon the affected part. If that part be the face, the favorite seat of the disease, the swelling extends to the eyes, which it soon closes; then involves the ears, which become enormously enlarged; and finally, when at its height, the features of the patient are so obliterated as to render him unrecognizable by his nearest friends.

The pain, during this period, is of a burning, itching, or tingling character. Where the fever is high, the patient is restless, and delirium is not uncommon. There is some slight remission in the fever in the morning, though the fever is active from four to seven days when the inflammation reaches its height, the fever rapidly subsides, and by the tenth day the patient is convalescent.

With the decline in temperature the redness fades, the swelling subsides, and desquamation of the skin follows. If the scalp has been involved, a long-continued alopecia results.

Diagnosis.—The diagnosis of erysipelas is generally quite easy. Beginning with a chill, there is the early appearance of the local inflammation, in the form of a bright-red spot, and marked tumefaction, the redness rapidly and uniformly spreading. The surface being hot and painful, can hardly be taken for any other affection. Urticaria, erythema, acute eczema, or rhus poisoning, are not attended by the severe constitutional disturbance, and so are readily excluded in making the diagnosis.

Prognosis.—The prognosis is favorable; for while the fever is very active and the constitutional disturbance marked, the mor-

tality is very low. In old and impoverished subjects, the prognosis must be guarded, and also in infants and in puerperal women.

Treatment.—The treatment will be both constitutional and local, and if we forget, for the time being, the name of the disease, and treat the patient specifically, there is no question as to the outcome.

For the full, strong pulse and high temperature, give veratrum twenty drops, to water four ounces; a teaspoonful every one or two hours. To aid the sedative the patient should be sponged with warm water. If the tongue be pasty and dirty, sodium sulphite, a saturated solution every three hours, will be our best remedy.

Where the tongue is red and dry, muriatic acid will give relief, or if the doctor must give iron, this is his case, muriate tincture of iron one-half drachm, aqua *dest.* and simple syrup of each two ounces; a teaspoonful every two hours. Where the tissues are blue and full, tongue broad and moist, echinacea one to two drachms, aqua *dest.* four ounces, will be indicated. Of this give a teaspoonful every hour. Where the patient complains of burning and smarting, and there are one or more vesicles formed, and where the pulse is sharp and hard, rhus tox. is our best remedy; thus, aconite five drops, rhus tox. ten drops, water four ounces; a teaspoonful every hour. If the patient is dull and drowsy, the pupils dilated, belladonna ten drops, to water four ounces, is the remedy to use; but if the patient is restless with flushed face, or if there is active delirium, gelsemium replaces the belladonna. These remedies, given according to the above conditions, will tide the patient safely through the most severe attacks of the disease.

The local treatment will also depend upon certain conditions. Where the pulse calls for veratrum, the local lesion is red, hot, and painful, here the part should be painted with full-strength veratrum every three hours, and we may add to this agent a little glycerin to keep the surface moist. Where the part is dusky, belladonna and glycerin may be applied every two or three hours. Dr. Webster speaks highly of echinacea as a local remedy, and I am satisfied that its use would be beneficial. Where the part is intensely hot and painful, cold water will be found not only grateful to the patient, but also of benefit.

The diet should be fluid in character and highly nutritious. Milk, sherry whey, malted milk, eggs beaten in milk, and fruit juices will be appropriate. The patient should be nursed as in any other contagious disease, care being taken as to cleanliness of bed and linen and good ventilation.

SEPTICEMIA.

Definition.—That morbid process commonly known as blood poisoning, in which, with or without a local site of infection, there is an invasion of the blood by bacteria or their toxins.

Etiology.—Whether the disease is caused by streptococci, staphylococci, or a combination of micro-organisms, or to septic intoxication due to the ptomains developed from these organisms, or all these forces combined, has not been definitely determined. On one point, however, all are agreed, and that is, that there must be an absorption of septic material.

Thus it may result from the retention of a partially decomposed placenta or fetus, or a pus tube; old tubercular cavities in which is broken-down tubercle; from septic fluid in the pleural cavity, or from typhoid ulcers. It may be possible that chemical poisons or toxins when absorbed give rise to this condition. The trimming of a corn, the injury from a fish-fin, may be the open door whereby the poison may enter.

Pathology.—The blood is found to be dark, diffuent, and rich in bacteria. The liver and spleen are soft, dark in color, and show cloudy swelling. The lymphatics are swollen as a result of the inflammation that invariably exists.

Symptoms.—The symptoms of septicemia vary very greatly, according to the degree or kind of infection. Thus in sapremia, the infection is due to septic intoxication from putrefaction changes, and is caused, not by the presence of micro-organisms in the blood, but by ptomains, where the symptoms are less severe than in true septicemia, and where both cocci and toxins are present in the blood. The period of incubation is from one to three or four days.

If caused by ptomains due to changes in milk, cheese, or canned goods, the forming period is very short, only a few hours. A slight chill, accompanied by great gastro-intestinal irritation,

ushers in the disease. Febrile reaction follows the chill, the temperature reaching 103° , 104° , or 105° . The pulse, at first full and frequent, soon becomes small and rapid, with more or less prostration. In the more severe cases, delirium may early manifest itself, though the more frequent condition is that of dullness and apathy, changing to coma.

If there be local infection, as from the puerperal state, the symptoms may develop more gradually. Preceded by prodromal symptoms a marked chill announces the fever, which gradually rises until the temperature reaches 104° or 105° . The tongue, at first broad and coated with a dirty fur, changes to a dry brown coating. The breath is offensive, and the lochia fetid. The skin is dry and more or less constricted; urine high-colored and offensive.

The fever is irregular, sometimes showing marked remission; again of a typhoid type. A low muttering delirium, followed by coma and great prostration, frequently is the warning of the inevitable termination—death. Again the septicemia may be a combined infection as in diphtheria, pneumonia, tuberculosis, endocarditis, etc. Here the symptoms of the local disease precede, and often mask for a long time, the true condition. Thus in a case of diphtheria, the patient may have seemingly passed across the danger-line of a malignant form of the disease. The membrane disappears, the throat clears up, and yet our patient does not convalesce. There is a low, irregular fever, the pulse is small and feeble, the heart is poisoned by the toxins engendered, and the patient dies of heart-failure caused by septicemia; or, if recovery take place, weeks elapse before the patient's health is restored.

What is true of this disease is sometimes observed in pneumonia, erysipelas, and others of a kindred type. Where the infection is due to toxins, the symptoms are of a very grave nature, typhoid in character, the tongue early showing evidence of sepsis. The secretion tells the same story, while the nervous system confirms the evidence of both. Death is usually the termination of this form, in from three to seven days.

Diagnosis.—The history of the patient will assist materially in making our diagnosis. A retained placenta, a puerperal peritonitis, a tubercular ulcer, and kindred lesions, would shed much light on the case, while toxins from milk, ice-cream, cheese.

canned goods, etc., would be equally plain, and local injuries could not well be overlooked.

Its more rapid development and less marked initial chill would enable one to differentiate it from pyemia. In the latter disease the fever is more irregular, chills and rigors recurring as in malarial fever. A jaundiced appearance of the skin is more pronounced in pyemia, and, while not constant, should have weight in recognizing the disease.

Prognosis.—The prognosis will depend upon the character of the poison, the amount of infection, the ability of the system to remove the offending cause, and the skill with which we meet the septic processes by antagonistic remedies.

If the offending cause can be removed before the system is thoroughly infected, the case will terminate favorably. Where there is great gastro-intestinal irritation, the circulation rapid but weak, and when delirium appears early or coma becomes marked, the prognosis will be unfavorable.

Treatment.—It seems hardly necessary to say that we must get rid of all sources of putrefaction that are still further poisoning the patient. If a pus tube be the offending organ, it should be removed or drainage established. If the uterus contain offending material, it should be emptied of all débris. Where there is a diseased endometrium, it should be thoroughly curetted, and, when necessary, this should be followed by flushings with mild antiseptic solutions. Usually, however, the curetting alone is sufficient.

When due to suppurative peritonitis, the abdomen should be opened and free drainage allowed. In some cases a thorough flushing of the abdominal cavity with a weak saline solution will give satisfactory results. Any and all cavities that contain pus should be emptied when it is possible.

The internal medication will depend upon the phase of sepsis as shown by well-defined symptoms. Thus, a patient with a broad, pallid, dirty, heavily leaded tongue, would need a saturated solution of sulphite of sodium, while a patient with bad breath, foul secretions, and yellow, dirty tongue would need a saturated solution of potassium chlorate and hydrastis.

Where the tongue was dry, lips and teeth covered with sordes, the mucous surfaces red,

℞ Hydrochloric Acid.....gtt. x to xx, C. P.
 Simple Syrup,
 Aqua Dest.....āā ʒii. M.

will give good results.

Where the tongue is full and discolored, the tissues are full and purplish or dusky in color, echinacea or baptisia should be given. The organs of excretion should be kept free, that as much of the effete material as possible may be eliminated through these channels.

PYEMIA.

Definition.—An infectious disease due to the absorption of animal poisons, principally pyogenic organisms, and characterized clinically by the formation, in the various tissues and organs, of multiple metastatic abscesses.

Etiology.—One of the forms or a combination of pyogenic micrococci are held to be responsible, by experimental investigators, for this condition. The streptococcus and the staphylococcus are the forms most constant, though it is not uncommon to find the micrococcus lancidatus, the gonococcus, the bacillus coli communis, bacillus typhosis, bacillus pyocyaneus, and many other specific micro-organisms.

These pyogenic organisms, either by their specific action or by the toxins they produce, cause coagulation-necrosis of the neighboring tissue cells, and as this process extends, inflammation of the veins and other vessels takes place; as a result of this inflammatory action, the endothelium becomes detached, and with its contained micrococci are floated off by the blood-stream. In its course they reach some part of the circulatory system, where, owing to its diminished size, they can not pass through; as a result, the embolus thus obstructs the vessel, stasis occurs, and when the soil is suitable, these micro-organisms set up new suppurating centers.

Pathology.—The cadaver, strange to say, does not undergo putrefaction as rapidly as in septicemia. The first effect of the morbid changes are found in the veins, which result in thrombi. These float off and are found in the lungs, liver, spleen, kidneys, brain, and, in fact, the various organs and tissues of the body.

These thrombi, rich in micro-organisms, suppurate, and thus the so-called metastatic abscesses are formed.

The location of these abscesses depends, to some extent, upon the site of the primary focus. Thus, if it be in the region drained by the portal circulation, the liver would be the seat of these necrotic spots. If an ulcerative endocarditis be the seat of the primary lesion, the secondary abscesses will be found in the lung, spleen, kidneys, brain, intestines, and skin. These abscesses are usually small, though a coalescence of several of them may form quite a large cavity.

A favorable seat for the primary foci, when not traumatic, is the subcutaneous cellular tissue; the pelvic cellular tissues and organs; the marrow of the long bones; the neighboring tissues of the middle ear cavity; the joints, and, as already stated, an ulcerative endocarditis.

Symptoms.—The symptoms of pyemia vary greatly in different cases, depending, to a great extent, upon the local lesions, though the general symptoms will be similar in all cases.

Incubation.—Since the disease is secondary to suppuration in some part of the body, morbid changes have been going on for several days before the pyemic state is reached. From five to ten days after the reception of the wound may be considered the forming stage. The symptoms during this time are not characteristic, but may be the same as those of other lesions; viz., general malaise, headache, loss of appetite, a furred tongue, slight constipation, and a sensation of continued weariness.

The disease is ushered in with chilly sensations or a pronounced rigor. These may recur at irregular intervals, or be so regular in their cycle as to be mistaken for malaria. Following the chill, there is a rapid rise in the temperature, reaching 103° or 104° in a few hours, to be soon followed by a drop of several degrees, and attended by profuse sweating and great prostration. The fever is of an intermittent or remittent type, and interspersed by frequent chills.

There is usually but slight gastric disturbance, though the appetite is gone, the tongue is furred, and a peculiar sweet, nauseating odor tells of the involvement of the internal organs.

Where the lungs are the seat of the abscess, there is more or less dyspnea, cough, and sometimes a purulent expectoration follows. If the abscess be located superficially, there may be

pain and symptoms of pleurisy present, while a rusty sputum tells of pneumonic complications.

When the liver is the seat of the local trouble, the conjunctiva and skin assume a decided jaundiced appearance. There is tenderness over the liver, and percussion reveals quite an enlargement. Diarrhea is a frequent accompaniment.

Pain, marked tenderness, and enlargement in the left hypochondrium would suggest splenic infarction.

Involvement of the kidneys will be recognized by albumen and casts in the urine, and sometimes pus and blood.

The rapid but feeble pulse, the sense of oppression in the cardiac region, would suggest endocarditis.

Delirium, followed by coma, would suggest the brain as the seat of the embolic abscess, while hemiplegia, strabismus, ptosis, deafness, etc., would determine the meningeal character without doubt.

The location of pain, the swelling and tenderness, would determine arthritic complications.

The course of the disease is marked by rapid loss of flesh, great prostration, excessive sweating, and frequent bed-sores; the patient usually dying from exhaustion or the involvement of some vital part by the suppurative process.

In chronic cases the patient may linger for months, the fever assuming a remittent type, chills occasionally intervening. The emaciation is progressive, the skin is dry, yellow, and shriveled, and ugly bed-sores may render life almost unbearable. After weeks or months of suffering, the patient succumbs to the superior septic process that waged a successful warfare.

Diagnosis.—The diagnosis is usually comparatively easy, though in some instances it may be overlooked or mistaken for typhoid fever. The irregular intermittent fever may at first be mistaken for malaria, but the administration of quinia will determine its true character, quinia having no influence in arresting the periodicity of pyemia.

The diarrhea and enlarged spleen might be mistaken for typhoid fever, but the absence of rigors, the profuse sweats of the former, and the typical eruption of the latter, will enable one to differentiate between the two.

Prognosis.—Pyemia is a very grave disease, and is usually fatal, some cases lasting only a few days. Where the surgeon can

come to our aid, evacuating pus cavities and securing good drainage, and where the vitality is strong, an occasional recovery takes place.

Treatment.—Wherever possible, abscesses should be thoroughly emptied, flushed with antiseptics, or packed with antiseptic gauze, frequent dressings being necessary to keep the cavities sweet and clean. Unfortunately the region of suppuration is, many times, inaccessible, and we must resort to medicine to combat the suppurative process. Echinacea in full doses will be used with the usual symptoms calling for this agent,—the mineral acids, where the tongue is dry and red; the sulphites, where the tongue is coated with a nasty, dirty, moist coating; and the chlorates, with the unpleasant odors.

Calcium sulphide is generally indicated wherever there is pus, and may be administered on trial.

For the profuse sweating, aromatic sulphuric acid or atropin will be given.

A nutritious diet to support the patient's strength is an important feature.

TUBERCULOSIS.

Definition.—An infectious disease, generally recognized as caused by a micro-organism, the bacillus tuberculosis of Koch, and characterized by the formation of small nodular bodies, tubercles, varying from the size of a millet-seed to that of a mustard-seed, or even larger. They may infiltrate the general tissues, miliary tuberculosis, or, aggregating, form tubercular masses. These bodies undergo caseation, followed by ulceration or, more rarely, calcification.

History.—Could one write the history of tuberculosis in full, he would chronicle more suffering, more distress, and more deaths from this lesion than from any other disease that flesh is heir to. For twenty-five centuries this foe of the human race has steadily marched the highways of life, his victims increasing in numbers with the advance of years, and the twentieth century is compelled to record the awful fact that, notwithstanding our great advance in hygienic and sanitary measures, and notwithstanding our increased knowledge of this devastating scourge, and all our pro-

phylactic means, one-seventh of all deaths recorded are due to this disease.

Its habitat is found all over the world. Previous to 1810 the study of this disease had been principally a clinical one, and was regarded as a suppurative process, but with the advent of Bayle and his pupil, Laennec, the tubercle was studied as a distinct, anatomical growth. The cheesy gland gave way to a distinct nodule or tubercle.

From this new era its development has been more rapid. In 1865, Villemin startled the medical world with his experiments on rabbits and guinea-pigs. He inoculated these innocent victims of science with cheesy products and tubercular particles, and invariably produced tuberculosis, proving beyond all doubt its infectious character. He writes, "Tuberculosis is the effect of a specific causal agent, a virus." Repeated experiments by other investigators confirmed its infectious character, and from this time forth the search began for the infecting cause.

This Koch announced to the expectant world March 24, 1882, before the Physiological Society of Berlin, as the bacillus tuberculosis. Since then the profession has largely acknowledged the bacillus as the exciting cause, though some still contend the micro-organism is the result and not the cause.

Zoological Distribution.—This disease, so fatal to mankind, is widely distributed among the animal world, especially domesticated animals; in fact, it is only found in wild animals after having been reduced to captivity, proving that environment is one of the predisposing causes of tuberculosis.

Of domestic animals, cattle are by far the most frequently affected, especially dairy cattle. Dr. Carpenter stated before the British Medical Association, held in Glasgow in 1880, that he was informed by a London meat inspector that 80 per cent of the meat sold in the London markets was tuberculous, and that, if this were all condemned, the inhabitants could not be fed. While this statement is most likely exaggerated, it shows that it is extremely common in cattle.

Swine are next in order of frequency, while sheep and goats are almost free from it. The horse is not often affected, though not exempt. Fowls are frequently troubled, though the tuberculous material is of a milder and less infectious character. Monkeys, when brought into captivity, are peculiarly susceptible,

Forbes stating that 43 per cent dying in the London Zoological Gardens succumb to tuberculosis. Dogs and cats, for a long time considered proof against its ravages, are now found tuberculous, most likely from their close association with man. Rabbits and guinea-pigs, when domesticated, soon show the same tendency.

Geographical Distribution.—Tuberculosis is the most universal of all diseases, and is to be found in all parts of the world, perhaps more extensively in warm climates than cold; however, the local conditions figure more prominently than climate. Wherever large masses of people congregate, there tuberculosis prevails.

Altitude has a more deterring influence on tuberculosis than latitude, and at one time it was supposed that the high mountain regions were exempt; and while the condition of the atmosphere is undoubtedly purer and more fatal to the bacillus, yet the fact, that the mountainous regions are more sparsely settled than the valleys, is not to be overlooked, and were the summits of the highest ranges densely settled, we would, in all probability, find the disease very prevalent. Cities, then, with their teeming thousands, where many are crowded into close quarters, where the sun never enters, where foul and dark quarters house the submerged half, where malnutrition is the rule, and the unhygienic surrounding breeds disease,—these are the plague-spots of tuberculosis, and wherever these conditions are found, be it hot or cold, in valley or on mountain-top, tuberculosis will be found.

Etiology.—Predisposing Causes.—Heredity.—That a child born of tuberculous parents is very prone to become tuberculous has been recognized by the profession in all times, though till very recently it was denied that a child ever came into the world with tubercles already developed. It was believed that a child simply inherited an enfeebled vitality, which was unable to resist the encroachments of the specific infection; in other words, they furnished the soil for the reception and development of the virus, whatever that may be.

Lehmen, however, records a case of undoubted intra-uterine infection, and, as proof, found tubercles, in which the bacilli were found in great numbers, in the spleen, lungs, and liver of a child who died one day after birth, the mother having died three days after delivery, with tubercular meningitis.

Pregnant animals have been inoculated, and the offspring

found to be tuberculous at birth. While this is undoubtedly true in rare cases, the fact is apparent to all medical observers that the heritage bequeathed by tuberculous parents, is a feeble vitality, feeble digestion, feeble assimilation, resulting in malnutrition—conditions favorable for the development of the disease.

Race.—Race is quite a factor in the receptivity of the infectious material. In the negro tuberculosis occurs more than twice as often as in the white race. The Indian is also very susceptible to its ravages, while Sears found 50 per cent of his cases to be of Irish descent. Perhaps the least susceptible of all peoples are the Hebrews, and no doubt their mode of life, which has been taught from generation to generation ever since Moses left his incomparable laws to his people, is largely responsible for this exemption.

Previous infectious diseases, such as la grippe, chronic bronchitis, measles, whooping-cough, typhoid fever, diabetes, etc., are often followed by tuberculosis. They furnish the soil, which only needs the planting of the seed for its development. Children begotten of syphilitic and cancerous parents come into the world handicapped by a feeble vitality, and the conditions are favorable for tuberculosis.

Environment.—The surroundings, habits, and occupations also figure prominently as predisposing causes. Among that large class of the human race, known as the submerged half, their method of living is conducive to the disease. Herded together in close quarters, where the sun never finds its way, where foul air reeks with the poison given off from the filthy inhabitants, and where wholesome food is an unknown quantity, we find all the conditions favorable for the disease.

Dissipations of all kinds also tend to produce it, while occupations that are attended by inhaling irritant particles, render the subject peculiarly liable. Summing up the predisposing causes, we find that,—whether the result of heredity, such as tuberculous, syphilitic, or cancerous offspring, or from environment—poverty, drunkenness, or occupation, or from previous diseases; whether catarrhal or infectious,—they all produce the same result; viz., an enfeebled vitality, a poorly elaborated blood and feeble resisting power; and when the infectious material, whatever it may be, gains entrance into the system, the battle begins. The conservative forces of the body are marshaled for

the fray, the leukocyte or phagocyte against the parasite. The weak succumbs to the strong, the bacilli come off victorious, and tuberculosis is established. The vitality having been reduced, the contest is a short one.

Exciting Cause.—The bacillus tuberculosis of Koch is now generally recognized as the exciting cause. This organism is a slender, rod-shaped body, straight or slightly curved, and, in rare instances, branched. Its average length is from one and one-half to three and one-half microns, or one-half the diameter of a red-blood corpuscle. After staining, it presents a beady appearance, which may be due to the presence of spores. (See frontispiece.)

It stains slowly with the basic aniline dyes, and what is peculiarly characteristic is its resistance to decolorizing agents, such as a twenty-per-cent solution of sulphuric or nitric acid, the bacillus of leprosy being the only other micro-organism possessing this same characteristic. It may be grown on blood serum, glycerin, agar, bouillon, or potato, but more easily on blood serum, which must be kept at 98°, the temperature of the body. It requires about two weeks for their development, when colonies appear on the culture medium in the form of thin, grayish masses of scales.

Its vital tenacity is also characteristic, and, whether inside or outside the body, has great resisting power. These bacilli survive freezing and desiccation, and live indefinitely outside the body. In the body they are found in all tubercular masses, though in varying quantity, the greatest numbers being found in actively forming tubercle. Should a tubercular mass open into a vein or lymph tract, they will be found distributed to every tissue of the body.

Outside the body they are found principally in the sputum. Nuttall has estimated that several billion are thrown off daily by a phthisical patient during the advanced stage. The sputum drying, is reduced to dust by the friction that is constantly going on, and this dust permeates the atmosphere everywhere, settles upon furniture, draperies, carpets, the bed-linen, in fact, upon every article in the home of the afflicted, as well as upon walls and ceilings. When this dust is dislodged, it again floats in the air and is even then a source of danger.

The bacillus may be found in quite large numbers in the nares of people occupying or visiting these infected quarters. The

chemical products resulting from the evolution of the bacillus and infected tissue has not yet been determined.

Mode of Infection.—The most frequent manner of receiving the infectious material is, undoubtedly, through respiration, and the minute bronchial tubes and lung are the first to show its ravages, although the nares and larynx follow in quick succession. At other times it gains entrance through the digestive apparatus, through infected meat and milk. Hereditary transmission, while possible (tubercles having been found in the fetus), is extremely rare and is most likely transmitted through the blood by way of the placenta. Inoculation may occur, by coming in direct contact, through cuts, fissures, excoriations, abrasions of any character, and generally assumes the character of tuberculosis of the skin.

Pathology.—Any organ of the body may be the seat of the disease, though some special parts are peculiarly susceptible. In the adult the lungs are the most frequently affected, while in children the lymph glands, joints, and intestines are the seat of election. The brain is also quite often the seat of the lesion, while the other viscera, liver, kidneys, spleen, and heart are less seldom affected.

Tubercle.—The invasion of a suitable soil by the bacilli or virus, induces characteristic phenomena of the tissue-cells. The poison, whatever it may be, excites the connective tissue-cells, there is an increased proliferation of these bodies, while out from the blood-vessels migrate polynuclear leucocytes. In or near the center of this mass of cells, a few cells enlarge, either by fusion or by proliferation of their nucleus, and become giant cells; others near them enlarge, and are called epithelial cells, and this mass of cells constitutes a small nodule or tubercle.

It is non-vascular, and early undergoes necrosis. The origin of the giant cells is not very clear, but they are generally regarded as being developed from phagocytes, and are found more abundantly where the bacilli are few in number. The tubercle at first is of a grayish color, but very soon this turns to a yellowish hue, owing to the destructive changes that take place.

Caseation.—Either from a poison, developed by the bacilli, or from some other source, necrosis of the cells occurs, forming a cheesy condition known as caseation; at a later period this breaks down, forming an abscess, the cavity being filled with purulent material.

Sclerosis or Fibrosis.—Sometimes nature comes to the rescue, and a secondary inflammation arises contiguous to the mass; there is cell proliferation, and the tubercular mass is enveloped in a capsule or fibrous tissue. Sometimes the transformation of the tubercle is complete, leaving a hard, indurated, fibrous nodule.

Calcification.—At other times there is a calcareous deposit, and the tubercular mass is said to undergo calcification. We thus see going on in tubercular patients a war of forces,—the constructive arrayed against the destructive; and only as the physician succeeds in building up the vital forces, enabling the tissues to resist the encroachments of the bacilli or toxins, will he be successful in benefiting his patient.

Miliary Tuberculosis.—When the infectious material is distributed to all parts of the body through the general blood supply, we have the formation of small nodules, millet-seed in size, formed in the various tissues, though the distribution is unequal, being abundant in some organs, while few in others. This form generally results from the breaking down of an old lesion, either a lymphatic gland, a pulmonary lesion, a tubercular bone-marrow, or the involvement of the liver or spleen.

Acute Miliary Tuberculosis.—Typhoid Form.—This form bears a striking resemblance to the infectious fevers, especially that of enteric fever, and unless the physician is familiar with the family history, where tuberculosis is well established, the diagnosis may not be confirmed till after death.

There is usually a period of incubation as in typhoid fever, though somewhat different. The patient notices that he is growing more feeble, is losing flesh, and is taking on a cachectic appearance. The appetite fails or is capricious, and the tongue is dry or furred. After days, or sometimes weeks, of progressive decline, the patient becomes feverish, though the temperature chart shows it to be different from that of enteric fever. It is irregular, and does not show the gradual "step-ladder" rise the first week, so characteristic of typhoid. In fact, there may be sub-normal morning temperature, and in rare cases it is afebrile.

There is generally some cough, though not more marked than often attends enteric fever. The respiration is more hurried, and the pulse is small and rapid, rarely dicrotic. There may be active delirium, though more often the patient grows dull, and is inclined to be passive, sleeping much of the time. There is nausea,

and sometimes vomiting. In the early stages there is constipation, but as the disease progresses, there is diarrhea, and where there are tubercular ulcers of the intestines, there may be some hemorrhage. There may be tympanites. There is no eruption.

As the end approaches, there is the Cheyne-Stokes respiration. The spleen is somewhat enlarged, though not so marked as in typhoid. This form is fatal, and a favorable prognosis should never be given.

Diagnosis.—While there is a marked resemblance to enteric fever, if the physician is careful, he need make but few mistakes. During the period of incubation, there is a normal or subnormal temperature, the patient loses flesh and strength, and there is nearly always some cough. When the fever makes its appearance, it is irregular in character, not uniform. There is no eruption. The respiration is generally more rapid and the pulse never dicrotic; and, lastly, though perhaps I should say first, there is the family history, which generally points to tuberculosis as a primal factor.

Pulmonary Form.—The general symptoms embrace most of those already mentioned, plus a more marked pulmonary group. The first symptom noticed, is a cough which may have existed for months, and been regarded as "cold on the chest," or, if a child, it frequently follows measles or whooping-cough. The fever is quite active, the temperature ranging from 103° to 104° or 105° . The respiration is increased in frequency, and is more or less labored. The face is inclined to be cyanotic, especially during or following an attack of dyspnea. The pulse is rapid and sometimes irregular. The cough resembles that of broncho-pneumonia, the expectoration is muco-purulent, and, if the inflammation is active, may be rusty-colored.

The physical signs are those of bronchitis or broncho-pneumonia. On auscultation, we hear sibilant rales, if there is but little secretion; or there may be fine, crepitant rales, telling of the gradual effacement of the air-cells by accumulation of mucus, or the deposit of tubercular material.

Diagnosis.—As in the preceding fever, the diagnosis is not easily made. The history of tuberculosis, coupled with the knowledge of a chronic cough, or following an attack of measles or whooping-cough, or diseased lymph glands; the marked dyspnea, the cyanotic appearance of lips, the high temperature, with rapid

pulse,—are symptoms that point to this form of miliary tuberculosis.

Meningeal Form.—This form is perhaps more frequently found in acute tuberculosis than either of the other forms, or both combined. It occurs more frequently among children between the ages of two and six, though it may occur at any time of life. It was known by the older writers as hydrocephalus or dropsy of the brain.

The primary affection can very often be traced to tuberculosis of the lymph glands, while the exciting cause may be any of the infectious fevers incident to childhood, or the lesion may be regarded as arising from a fall.

The tubercles, especially in children, are deposited in the membranes at the base of the brain and in the sylvian fissure; becoming inflamed, a sero-fibrinous or fibro-purulent exudate is deposited, in which are found entangled the tubercles, varying in size from the microscopic to those plainly visible by the unaided eye. The meninges being affected accounts for the symptoms resembling meningitis.

The disease may begin more or less suddenly, with marked cerebral excitement, or convulsions may usher in a severe form that may prove fatal in a few days. As a rule, the disease has a course of from two to six weeks in children, and from three to five months in the adult.

Symptoms.—*Prodromal Stage.*—This stage may last for some weeks, especially if following measles or whooping-cough or the infectious diseases of childhood. The child is cross and fretful, restless at night, the appetite capricious, the breath is bad, and the tongue is coated. The bowels are usually constipated. The child has occasional spells of vomiting, which can not be traced to wrongs of the stomach. The patient loses flesh and strength, the face has a pinched appearance, the eyes are contracted, and the child, if old enough, complains of pain in the head.

Stage of Cerebral Excitement.—These symptoms grow more pronounced till the stage of excitement is fully ushered in. Chilly sensations, accompanied by severe headache and vomiting, may usher in this stage. The pain in the head is often of an intense character, the child uttering a sharp, piercing, hydrocephalic cry. The face is flushed, eyes bright, and pupils contracted. The

screams of the child may persist for hours or until the child is completely exhausted.

Vomiting, so characteristic of cerebral irritation, is a prominent symptom. The bowels are obstinately constipated. The fever is usually not very high, the temperature ranging from 101° to 103° , though sometimes it may reach 104° or 105° . The pulse is small and rapid during the early days of the fever, but grows irregular as the disease advances. With the progress of the disease, owing no doubt to the pressure caused by the exudate, the cerebral symptoms become more passive. The patient becomes dull and drowsy, the pupils, which at first are contracted, now dilate, and the child sleeps with the eyes partly open. There is twitching of the muscles, and retraction of the head, especially when the spinal meninges are involved. The respiration may become irregular and sighing.

Stage of Paralysis.—This stage occurs as the patient nears the end of the struggle. The patient can not be aroused, lies with the eyes partly closed, and there is involuntary twitching of tendons and muscles. Paralysis of the third nerve is most common, which may involve the face. Optic neuritis, together with strabismus or ptosis, is not uncommon.

Hemiplegia may occur. Osler records two cases of monoplegia of the right side of the face, with aphasia. In rare cases a typhoid state develops, tympanites occurring with diarrhea. The tongue becomes dry, brown, with sordes on teeth and lips; low delirium follows, the urine and feces are discharged involuntarily, the temperature falls, and death ends the scene.

Diagnosis.—A history of old foci, especially of the lymph glands, so far as can be learned; the irregular course of the fever; the excruciating pain in the head, attended by shrill screams; the constipated condition of the bowels; the coma, twitching of various groups of muscles; and finally paralysis of certain parts,—render the diagnosis not extremely difficult.

Prognosis.—The progress is decidedly unfavorable, and though cases of recovery have been recorded, it may have been that a mistaken diagnosis could have accounted for the favorable termination.

TUBERCULOSIS OF THE LYMPH GLANDS.

Synonyms.—Scrofula; Struma; King's Evil.

For more than two thousand years inflammation of the lymphatic glands has been recognized under the head of scrofula, and, even at the present day, there are those who, while acknowledging a very near relation, are not quite ready to admit their identity. Certain it is, that tuberculosis of the lymph glands is of a much milder and less infectious character.

It took the name King's Evil from the prevalent idea that the touch of a king was curative. That enlarged glands were far more common two centuries ago than now, may be inferred from the number touched by Charles II. During twelve years of his reign (1702-1714), he is said to have touched ninety-two thousand, one hundred and seven persons, and as the methods of travel were primitive, these thousands were in all probability in the near-by districts.

The investigations during the past twenty-five years, however, have changed all this, and the medical profession now recognizes scrofula as a form or variety of tuberculosis.

Etiology.—Anything that tends to lower the vitality of the lymph tissue is a predisposing cause. Poverty and environment are fruitful causal conditions, and tuberculosis of the lymph glands is much more common among the extreme poor than the well-to-do.

Age.—While this form may occur at any age, it is exceedingly rare after middle life, the greatest number of cases occurring among children.

Race.—The negro is peculiarly susceptible.

Catarrhal conditions of the mucous membranes render the patient far more susceptible than those otherwise affected. The germs lodge upon the mucous membranes in naso-pharyngitis, and readily find their way into the lymph channels, and are carried to the near-by glands. Tonsillitis, for the same reason, may be the forerunner of tubercular adenitis.

Eczema may furnish a rich soil for the reception of the germ, which in turn finds its way into the lymph current, and the glands receive the force of the poison.

Clinical Forms.—The various phases of this variety may be grouped under two heads: generalized tubercular lymphadenitis, and local tubercular adenitis.

Generalized Tubercular Lymphadenitis.—This form may involve the lymphatic system at large, while the viscera may escape. The cervical lymphatics are more frequently the seat of infection, though any group may be the source, and the general infection which follows might be regarded as secondary. Usually its course is chronic, though it may have an acute course.

Symptoms.—Although there is no evidence of lung trouble, the patient is going into a decline. There is loss of flesh and strength, the appetite is capricious, the tongue furred, and secretions are deranged. A fever, irregular in character, is a marked feature. Emaciation becomes marked, while the cervical and axillary glands become swollen, with a tendency to suppuration. In the general appearance there is a great resemblance to Hodgkins' disease.

Local Tubercular Adenitis.—Cervical.—This form is the most common of lymphatic lesions, either in the adult or child, and is peculiarly frequent among children of the poorer classes. Insufficient food, or, more properly speaking, improper food, together with bad air and unhygienic surroundings, as were seen but a few years ago in nearly all eleemosynary institutions, give rise to a large percentage of scrofula. How many of these cases were from tubercular parents could not be determined, though, if present in latent form, the poor surroundings and food early developed it.

The proof that environment was a productive cause is seen in the marked decrease of cases in the past few years, with a radical change in the care of these unfortunate waifs of humanity who are cast upon the public welfare. In fact, the records show that most of the inmates are discharged at the present day in a far healthier condition than when admitted.

In Keating's *Cyclopedia of Diseases of Children*, a realistic picture of the condition of things which existed under the old régime is given as follows:

"Some years ago I had a very melancholy but convincing proof of the effects of improper food in producing scrofula upon five or six hundred children in the House of Industry (Dublin), of all ages, from a year to puberty. The diet of the children consisted of coarse brown bread, stirabout, and buttermilk, generally sour, for breakfast and supper; of potatoes and esculent vegetables, either cabbage or greens, for dinner; and sour buttermilk

again for their drink. They were confined in their dormitories and schoolrooms of insufficient extent for their number, there being no playground for the children; consequently, they were deprived of that exercise, so natural and necessary for the development of the frames of young animals, and which might have enabled them to digest in some degree their wretched and unwholesome diet.

"Under this cruel mismanagement, they lost all spirit for exercise or play; and on visiting the rooms in which they were incarcerated, the air of which was impure to a degree only to be compared to jails of former times, these wretched little beings were seen squatted along the walls of their foul and noisome prisons, resembling in their listless inactivity an account I have somewhere read of savages met with in Australia, their faces bloated and pale, and their stomachs as they sat nearly touching their chins.

"Upon a closer examination of these children, it was found that, in general, the upper lip was swollen, the tongue foul, or sometimes of a bright-red color, indicative of acidity of the stomach, the breath offensive, the nostrils nearly closed by the swelling of the mucous membranes, the abdomen tumid and tense, and the skin dry and harsh; but, that which appertains most to my present subject, the cervical glands were more or less swollen and tender; and I am within bounds when I assert that nearly one-half of those unhappy children had the characteristic signs of scrofula in their necks."

This form is also very common among the colored race.

Symptoms.—The first evidence in this, as in all other forms of tuberculosis, is an enfeebled vitality, and the various symptoms that arise from an imperfect elaboration of blood. The visible local manifestation is the enlargement of one or more of the cervical glands, usually the submaxillary. These are generally spoken of by the parent as kernels, and may remain quite small and firm for weeks, when, from cold or perhaps from some of the many unassignable causes, the vitality is still further reduced and a new activity is developed in the glands, which increase in size, varying from that of a walnut to that of an egg.

There is usually a greater development on one side than on the other. A low form of inflammation sets in, and deposits take place in the adjacent tissues, which become swollen and hard.

The inflammation now becomes more or less acute, the part is reddened, painful, hot, tender on pressure, and the swelling increases rapidly. Continuing in this way for a longer or shorter time, suppuration commences, and the deposit is gradually changed to pus, which in time makes its way to the surface and is discharged.

This occupies a variable period of time, sometimes passing through all its stages in eight or ten days, and at others occupying as many weeks. In some cases the inflammation is acute and the pain severe, but in others it progresses without much redness, heat, or pain. The pus forms slowly in many cases, and there is but little tendency to its discharge, while in others weeks pass, the part still continuing hard; and at last, when our patience is nearly exhausted, suppuration occurs rapidly.

Sometimes the pus is well formed and healthy, and, when discharged, the part heals rapidly; at other times it is watery, of a greenish-brown color, or clear, with more or less flocculent material mixed with it. Occasionally the abscess exhibits no tendency to point, but the pus burrows in the tissues for a long time, unless it is opened. In other cases, when the pus is discharged, the abscess does not heal, but continues to discharge a dirty flocculent pus; and if we examine it, we will find the walls ragged and often a chain of lymphatic glands dissected out and lying at the bottom.

The constitutional disturbance varies greatly. Sometimes there is quite a brisk febrile action when inflammation first comes up, with loss of appetite, arrest of secretion, and much prostration. In these cases suppuration is frequently marked with a chill or rigor, and occasionally attended by hectic fever and night-sweats. The fever may be very irregular, assuming either a remittent or intermittent type.

In other cases the only systemic disturbance is the gradual loss of flesh and strength, derangement of the secretions, a pallid or waxen appearance, with progressive emaciation. With the enlargement of the cervical glands the post-cervical, supraclavicular, and the maxillary may also become involved.

Tracheo-Bronchial.—This form is usually preceded by a catarrhal condition of the bronchial tubes, and may be primary or secondary to pulmonary infection; the primary form being especially common in children, Northrup recording affection of

the lymph glands in every one of his one hundred and twenty-seven cases examined in the New York Foundling Hospital.

These glands are the catch-basins for the various débris which have escaped the destructive action of bronchial and pulmonary phagocytes; consequently, they become frequently infected, and undergo changes similar to those of the cervical glands; namely, become swollen, tumefied, and finally caseate or calcify.

In the advanced stage there is a tendency to form abscesses, which may rupture into the lung, bronchi, or trachea. These glands may assume quite a large size, though they rarely ever produce pressure sufficient to impair respiration.

Symptoms.—The general symptoms are those of impaired or enfeebled vital force. There is a progressive decrease in flesh and strength, and the general condition is well described as “going into a decline.” If perforation of the lung, bronchi, or trachea has taken place, there will be cough, with expectoration of a cheesy purulent or bloody material. When secondary infection of lung takes place, the symptoms are those of phthisis.

Mesenteric.—*Tabes Mesenterica.*—This form is usually met with in children, and is rare after the age of twenty-one. It may be primary, when it is frequently associated with intestinal catarrh; or secondary to tuberculosis of the intestines. The glands of the mesentery enlarging, caseate, though rarely followed by calcification or suppuration.

Symptoms.—The symptoms are those of malnutrition. In children it is usually preceded by diarrhea and gradually increasing prostration. The appetite is usually good, sometimes ravenous, but the patient receives no apparent benefit. The bowels are sometimes tumid, hot, and tender; at others very much shrunken; the evacuations, consisting of a thin mucus, greenish in color, and frequently resembling the washings of meat.

The countenance is contracted and pinched, the eyes set far back in the head, and the skin peculiarly dry, wrinkled, and sallow, giving the child a prematurely aged appearance. He is restless, irritable, and fretful, and presents many of the symptoms of cholera infantum.

In the adult there may or may not be diarrhea, frequently there is diarrhea alternated with constipation, and sometimes severe pain. There is a marked marasmus, increasing day by day, though the appetite may be good and the digestion seemingly well performed.

The patient has an anxious expression of countenance, a sallow, wrinkled skin, contracted abdomen, and is uneasy, restless, and irritable.

In the latter stages diarrhea sometimes sets in, and carries the patient off quickly, or disease of the brain or lungs comes on to assist the tabes. In both cases the enlarged glands may escape detection, owing to the distention of the abdomen, due to the associated peritonitis, though where the abdominal walls are flabby the enlarged glands may readily be felt.

Diagnosis.—The diagnosis is not easily made in the early stage of the disease. As it assumes a chronic form, however, the child becomes thin, puny, and emaciated, despite the fact that the appetite has not failed and sufficient food has been taken to nourish the patient. These symptoms, together with the persistent diarrhea, associated with more or less peritoneal involvement, and the enlargement of the mesenteric glands, which can be readily felt through the abdominal wall, render the diagnosis comparatively easy.

ACUTE PNEUMONIC PHTHISIS.

Synonyms.—Acute Phthisis; Galloping Consumption.

This variety occurs in persons whose vitality has been reduced by previous illness or who have led an exposed or dissipated life. While it may be primary, by far the larger number is secondary to a pre-existing tubercular focus, as of the lung, pleura, mesentery, or lymph glands. While it may occur at any age, it more frequently selects for its victims children or early adults.

Pathology.—The tuberculous deposits may be confined to one lobe, but more frequently the entire lung will be involved, or small tubercles will be found thickly distributed throughout both lungs. The part affected has the appearance of a hepatized lung, is heavy, and contains but little, if any, air. The exudate in the air-cells may caseate, break down, and form cavities. The pleura is usually covered by a thin exudate, which, breaking down, leaves a purulent material. See Fig 20, p. 323.

Varieties.—Clinically, two forms are to be recognized, the pneumonic and the broncho-pneumonic.

Pneumonic.—**Symptoms.**—The disease often begins abruptly. The patient has been in apparent good health, though, when his

attention is called to his previous condition, he can generally recall a progressive feeling of malaise and loss of vitality. The attack may be preceded by a cold, though, as a rule, the onset is sudden, as in lobar pneumonia.

Following the initiatory chill, the fever rises quite rapidly, the temperature soon reaching 104° or more. The skin is dry, the urine is scanty, and there is constipation. The face is flushed, tongue coated, and a harassing cough, with severe pain in the side, is quite characteristic. The expectoration at first is frothy and mucoid in character, but soon changes to the characteristic rusty sputum of pneumonia. The breathing is humid, and where a large portion of the lung is involved, there is marked dyspnea.

The physical signs are those of pneumonia; namely, the crepitant, followed by the subcrepitant rhonchus, with increasing dullness on percussion. The fever may be continued or assume the remittent type. By the eighth or tenth day, when in pneumonia we look for a crisis, the fever becomes irregular, the dyspnea increases, the expectoration loses its rusty tinge, becoming yellow and of a mucopurulent character or of a greenish hue. The expectoration is abundant, and raised with less difficulty.

Night-sweats now appear, and the rapidity with which the patient shows the inroads of the disease is remarkable. The emaciation is rapid, as seen in the hollow cheeks and pinched features. The course of the disease varies from four to eight weeks, though sometimes the disease may last from four to six months, when the symptoms are those of chronic tuberculosis.

Diagnosis.—The diagnosis in the early stage is extremely difficult, unless there is a history of gradual failing health, or tubercular taint. The early symptoms all point to pneumonia, unless there should be hemoptysis, which might arouse suspicion. In the course of a week or ten days, however, the disease assumes a more characteristic form. The irregular fever; the continued dullness on percussion; the thick, greenish, mucopurulent expectoration; the rapid emaciation; the beginning of night-sweats,—are a group of symptoms that can not be overlooked.

Broncho-Pneumonic Form.—This form rarely attacks persons in good health, and the history shows a gradual decline. Chilly sensations, if not a marked chill, ushers in its presence, to be followed by a high fever. About this time hemorrhages may occur, which should arouse suspicion as to the nature of the dis-

ease. The fever is quite active, and a hard, irritating, bronchial cough, with pain in chest and lung, early manifests itself.

The expectorated material is at first a tough, viscid, glaring mucus, occasionally streaked with blood. As the smaller bronchioles become choked, the breathing becomes hurried and labored. The exudate fills the air-cells, and dullness is marked over the portion of the lung affected, usually the apex.

The breathing is now difficult, the expectoration is of a mucopurulent character, night sweats occur, emaciation is rapid, and "galloping consumption" is written upon the hollow cheeks, the pinched face, and the wasted frame. Sometimes, even after these grave symptoms appear, there will be an amelioration of all the symptoms, and the case passes into the chronic form.

In children the disease frequently follows measles, whooping-cough, scarlet fever, diphtheria, and influenza. The child, weakened by the infectious fever, is a fit subject for tuberculosis. The early symptoms are those of capillary bronchitis. The small bronchioles are first choked, and the lung complication soon follows. The child breathes with difficulty, and is disturbed by a hacking cough.

Weakened by previous sickness, the destructive forces rapidly do their work, and in from three to six weeks the little sufferer gives up the contest.

CHRONIC TUBERCULOSIS.

Synonyms.—Phthisis Pulmonalis; Consumption; Chronic Pulmonary Tuberculosis; Chronic Ulcerative Tuberculosis.

Pathology.—A post-mortem will reveal quite a variety of conditions. The apices of the lungs are the most frequent seat of the tubercular deposit, and from here the invasion proceeds till more or less of the entire lung is involved. The earliest tubercular deposit is generally formed from an inch to an inch and a half below the apex, and nearer the posterior than the anterior surface.

The first effect of the bacilli or toxin, however, is felt in the smaller bronchial tubes. As the disease progresses, the air-cells become filled with the same products, which caseate, and when a section of the diseased part is made, we see a yellow or grayish surface. Later several of these nodules coalesce, forming a tu-

bercular mass, which, undergoing necrosis, forms a cavity. These cavities vary in size and character. Some contain material of firm consistency; others, where the material is soft, lose all trace of organization; while still others contain a disgusting, purulent fluid, the result of mixed infectious material and broken-down tubercle.

The blood-vessels resist for some time the destructive force of the tubercle, and it frequently happens that a cavity will be crossed by one or more blood-vessels. Later, even these give way, sometimes accompanied by profuse hemorrhage. Again there will be areas where the tubercles are encapsuled. The bronchial glands are enlarged and contain tubercles.

The pleura is nearly always involved, with a fibrinous exudation, and the walls are frequently thickened by adhesions and the presence of tubercles. Tubercular infiltration often takes place in the larynx, and rarely in the pericardium. There is usually fatty infiltration of the liver. The intestines show ulceration with infiltration in many cases.

Invasion.—Few diseases present such a wide range of symptoms as chronic tuberculosis. This is due to the various ways in which it begins.

Gradual Invasion.—In many patients the invasion is so gradual that it is with difficulty we can trace its beginnings. It has been noticed that the general health has been giving way, the appetite has been capricious, the secretions irregular, and the patient looks anemic, with an ashen color of face. The strength fails from day to day, the breathing is hurried after slight exertion, and the patient's condition is aptly expressed in the popular phrase, "going into a decline."

The symptoms are those of malnutrition, and weeks, or even months, elapse before local symptoms are present.

Bronchitis or Influenza.—Next in frequency to the gradual invasion is an attack of bronchitis or influenza.

There may have been a catarrhal condition of the bronchial tubes resulting in frequent attacks of bronchitis, each lasting a little longer and being more persistent, the general health being gradually undermined, and, before the physician or patient is aware, tuberculosis has made its inroads.

Pleurisy.—Sometimes the first complaint is a sharp pain in the side, pleuritic in character; or a dry pleurisy, with friction

murmur and pain in apex, may be first recognized; or the pulmonary lesion may foster an attack of pleurisy with effusion, and though this is gradually absorbed, pain remains in the apex or under the shoulder-blade, and the cough persists.

Laryngitis.—At other times it begins with a laryngeal irritation, loss of voice, a hoarse cough, and some soreness of the throat. Although the local symptoms are of the larynx, many times the foci are of the lungs, and such an onset should arouse suspicion in the physician, and cause him to make frequent and careful examination of the lungs.

Hemorrhages.—While hemorrhage from the lungs does not always signify tuberculosis, it should always be regarded with grave suspicion; for it may be the first evidence of the disease, the tubercular invasion of the lung already having begun.

In some cases, the disease progresses rapidly from the first hemorrhage; at other times there will be intervals of weeks or months between the hemorrhages, to be finally followed by phthisical symptoms.

Osler speaks of a few, but very important, class of cases where the disease makes serious inroads before there are any marked symptoms to betray the disease.

These latent forms usually occur among the laboring classes, and a man may work for some time with a cavity formation in the apex of his lung, and not be aware of it.

Malarial Fever.—In malarial sections it is not uncommon to mistake the earlier phases of pulmonary tuberculosis for malarial fever. The regularity of the chills, fever, and sweats masks the condition so true to life that the real lesion is overlooked.

Symptoms.—Since the symptoms are so varied according to the different modes of onset, a clearer idea will be gained by dividing the symptoms into two classes, local and general.

Local.—Cough.—One of the earliest, most persistent, and most important symptoms is the cough, which not only announces the early stage, but usually continues throughout the disease. At first it is generally dry, short, and hacking, to be followed by an expectoration of glairy mucus, requiring some exertion for its removal; this gradually changes to mucopurulent material.

The cough, not infrequently, occurs in paroxysms, which greatly exhaust the patient. There seems, however, to be but little relation between the severity of the cough and the gravity

of the disease; for in one person there is but little sensitiveness of the respiratory apparatus, though the lesion is severe, while in another, although the lesion is but slight, there is extreme sensitiveness. The cough is usually more pronounced in the mornings and evenings, and after partaking of food and drink, in the latter case often resulting in vomiting.

Pain.—Pain is the unpleasant symptom of any disease, and, if persistent, adds to the gravity of the case. While it may be absent from beginning to end, it is generally present at some stage of the disease. It may be a sharp pain in the apex, or a stitch in the side, especially on taking a full inspiration. If pleurisy be present, the pain is lancinating or stabbing in character. Again, a common location of the pain is under the shoulder-blade or between the shoulders.

Expectoration.—The sputum varies as to quantity, quality, color, consistency, and odor, depending upon the rapidity with which the destructive process takes place, and also the form, whether or not there be mixed infection. At first it is white and frothy, or glairy, tenacious, and streaked with blood. This soon changes to an opaque and yellowish color, soon followed by a mucopurulent material. At times there will be soft, cheesy particles of a grayish color, which aids one materially in the diagnosis.

Where cavities form, the sputum becomes heavy, lumpy, coin-shaped, nummular, and of a greenish-yellowish color. There is a slight, sweetish, sickening odor in some cases, while in others there is but very little. Where there is mixed infection, there may be marked feter. In the earlier stages there may be considerable bronchial mucus mixed with the expectoration. In children and very old people the expectoration is very scanty.

In examining the sputum for bacilli, the grayish, cheesy particles should be taken, as they are rich in germs. To obtain elastic fibers, which is now regarded as of additional value, boil equal parts of the sputum and a solution of caustic soda; empty into a conical-shaped glass, and cover with cold water. The sediment can then be carefully examined for this product. Where calcification has taken place, there may be spit up with the mucus, particles of chalky material as large as a pea.

Hemoptysis.—Hemorrhage from the lungs varies very greatly in quantity and time. Some patients pass through all phases of

the disease without the suspicion of a hemorrhage. Other patients will show this alarming condition early in the disease, but as the case advances it disappears entirely; while another class of patients will "spit blood" more or less frequently during the entire progress of the disease.

In the early stages the hemorrhage is rarely ever profuse and never dangerous, while those occurring in the advanced stage may prove fatal, though this is very rare. The blood is usually bright red and frothy, characteristic of hemoptysis. The mucus may be simply streaked or tinged with blood, or it may be decidedly rusty. Hemorrhage most frequently occurs after mental excitement, or physical exertion, or paroxysm of coughing, though sometimes it occurs without any apparent cause. Thus, in one of my patients, the hemorrhage invariably occurred in the night, he being awakened by a choking sensation, which was due to the pressure of the blood.

In the milder forms it follows the cough, while at other times it seems to flow to the upper part of the larynx and into the pharynx, and is simply spit out. The hemorrhage is due, in the early stages, to hyperemia, and the blood exudes from the feeble vessels, most likely, due to pressure from tubercular deposits. After cavity formation, there may be erosion of a larger vessel, when the hemorrhage becomes alarming and very rarely fatal. In a practice of twenty-five years I have met with but one fatal hemorrhage in this disease; this in a child ten years old, who died in five minutes after the rupture of the blood-vessel.

Hemorrhage from the lungs, while not necessarily an evidence of tuberculosis, should always be regarded with grave suspicion, and cause careful and repeated examinations on the part of the physician.

Dyspnea.—In the early stage of the disease there is little suffering from "shortness of breath," unless preceded by active exertion. In the later stages, however, it often proves one of the most distressing conditions.

General Symptoms.—*Fever.*—One of the earliest symptoms, even before the cough, is an elevation of temperature, and if it remains constant for days, with a progressive decline in health, it is one of the most reliable evidences of the dread disease. The first evidence of the toxin in the blood is to produce fever, which varies in character. In one it will be of the continued type, while

in another it will be remittent or intermittent in character, or again partake of both, being decidedly irregular. In fact, the irregular character of the fever in tuberculosis is one of its characteristics.

The continued form prevails more frequently during the early stage, while the remittent is found during the later stages. When cavity formation occurs, attended by profuse night-sweats, the intermittent prevails. The intermittent is also seen in the early stage, if the patient has been subject to malarial fever, or lives in a distinctly malarial section, and care must be taken not to mistake this intermittent fever for a paludal fever.

Pulse.—The pulse is increased in frequency, is small, easily compressed, and in the later stages may be sharp and wiry.

Anemia.—The enfeebled vitality is accompanied by feeble digestion and assimilation. As a result of the excess of waste over supply, and the imperfect elaboration of blood, anemia is a necessary result. The pale or ashen color, often made more prominent by the bright red, hectic flush of cheek, is recognized, even by the laity, as belonging to phthisis.

Night-Sweats.—While night-sweats may appear early as the result of enfeeblement, it is more marked during the cavity formation period. At first these are but slight, the head and neck becoming moist, then confined to the thorax and upper extremities. At times they become very profuse, and the night-dress, and even the bed-clothing, are quite wet. These usually come on after midnight, in the early morning hours, though they may occur during the day when the patient drops asleep.

Emaciation.—Another characteristic of phthisis is the loss of flesh. Several factors combine to bring about this result. First the fever, for during any fever the waste exceeds the supply, and consequently there is general atrophy. This is doubly true in phthisis; and in all those cases where there is seeming improvement, where the patient, for a brief period, gains in weight and strength, it will be found to take place during the afebrile stage.

Loss of appetite, whereby insufficient food is taken to counteract the waste, is common. The early enfeeblement of all the forces is seen in a feeble digestion and assimilation. The result is, that the tissues are rapidly used up, without a corresponding renewal. The emaciation is in the adipose tissue first, and then the histogenetic. Where the fever is prolonged for months, it is

extreme, and the patient becomes a veritable living skeleton. With the loss of flesh there is a corresponding debility.

Gastro-Intestinal Disturbance.—The stomach early feels the force of the toxin, which is seen in the furred tongue. There is frequent nausea and sometimes vomiting, especially in the advanced stages and after a paroxysm of coughing. Often the tongue, which is narrow, elongated, reddened at tip and edges, speaks of an irritable stomach, which is attended by some pain and tenderness in the epigastric region. Small ulcers in the mouth are frequent, and are annoying to the patient.

Diarrhea.—While diarrhea may occur early in the disease, it is usually found in the advanced stages, and is one of the serious complications, adding greatly to the prostration. These unfortunates often have painful hemorrhoids or fistulas, which later increase the suffering and still further lower the vitality of the already reduced system.

Nervous System.—"Hope springs eternal in the human breast," is certainly true in this class of patients, and they are ever planning for the time when they shall regain their health, are easily encouraged with any favorable symptom, while changes for the worse are regarded as only temporary. Derangements of the nervous system are quite rare.

Complications.—An acute pneumonia is not an infrequent complication, while a diseased pleura is nearly always found at some stage of the disease. One of the most distressing complications is the involvement of the larynx. The husky voice or persistent attempt to clear the throat announces its presence. As the disease extends, aphonia becomes more complete, and the patient swallows with difficulty. Finally when ulceration extends to the epiglottis and walls of the pharynx, swallowing is no longer possible, food and fluids return through the nose, and the patient literally starves to death.

Physical Signs.—Inspection.—The eye reveals, to the skilled physician, definite and important conditions, characteristics that either tell of phthisis or of one susceptible to the disease.

The chest is long, narrow; and flat, with increased width of the intercostal spaces. The scapula stand out prominently like wings, while the epigastric angle is usually acute. Where cavity formation has taken place, there is flatness, the most frequent place being over the left apex. We are to remember, however,

that part of this is due to atrophy of the chest muscles. This chest is known as the "paralytic" or "phthisical chest." The respiration is diminished in all stages, but particularly over the apex.

Palpation.—The expansive power observed in inspection can be verified by palpation. By placing the palms on corresponding portions of the chest, one can readily gauge the expansive power of each. Especial attention should be paid to the clavicular areas, both above and below the clavicle. Vocal fremitus will be increased over the infected area, which the sense of touch reveals, tactile fremitus. At the base this vocal fremitus may be diminished or entirely absent, due to a pleural exudate.

Percussion.—The normal resonance is masked in proportion to the defect in expansion and areas of tubercular deposits. The early changes will be noted immediately above and below the clavicle. Similar points of the two sides must be compared both during inspiration and expiration and while breathing is suspended. Areas for careful examination are the supraspinous fossa and interscapular space.

Where the early deposit is near the surface, dullness will be recognized, but where the deposit is deep-seated and surrounded by emphysematous cells, the condition may be overlooked. When the cavities of the apex are thin-walled, the "cracked pot" sound will be heard. If carefully performed, much may be learned by percussion; but if carelessly done, but little information will be gained.

Auscultation.—If carefully performed, the knowledge obtained by auscultation is a valuable aid in diagnosis. Feeble respiratory sounds replace the normal rhythm in the early stage, and are suggestive as to the condition of the apices, or there may be a prolonged expiration during the early stage; while an interrupted respiration, the "cogged-wheel" form, may replace those already mentioned.

We are not to forget, however, that feebleness of respiration may be due to pleural exudates or thickening of the chest-walls, by tumors, edema, etc., and that prolonged respiration, while important, may result from a certain degree of bronchial narrowing, which, while it does not prevent a free entrance of air, hinders its exit, and that the interrupted or cogged-wheel breathing may occur in bronchitis.

As the disease advances, the inspiratory murmur becomes harsh, changing to a bronchial or tubercular character as consolidation increases. On deep inspiration, there may be a few dry clicks, evidence of unsoftened tubercle. With the progress of the disease there is increased secretion in the bronchial tubes, the result of progressive bronchitis, and crepitant and subcrepitant rales are heard. When the secretion is profuse, there is a loud mucous rhonchus. As cavities form, the cavernous and amphoric sound is heard. As the pleura becomes involved, pleuritic friction is heard.

Signs of Cavities.—While large cavities are generally easily recognized, there may be cavities that have never been discovered during life. We may be quite sure of a cavity, if persistent bronchial breathing occurs over a limited area combined with little dullness on percussion. The cracked-pot sound is heard when a cavity connects with a bronchus and is superficial.

In well-developed cavities gurgling rales may be heard, and the breathing is amphoric in character. Vocal resonance is frequently increased. Wintrich first called attention to the increase of the tympanitic character of the percussion note, when the mouth is opened and closed, also to change of position. Retraction in the interclavicular region becomes prominent when the cavity is in the apex. Where a cavity is empty and superficially located, vocal fremitus is increased. Pectoriloquy is often heard with these conditions.

Diagnosis.—It is essential that we make as early a diagnosis as possible; for, if recognized in its incipency, there is some hope of effecting a cure, especially if the patient is in a position to profit by the suggestions of the physician as to change of environment, change of climate, etc.

When a patient shows a progressive decline in flesh and strength, with a daily elevation of temperature from a half degree to a degree and a half, a hacking cough, more severe on rising in the morning, occasional pain in chest, particularly over the apex, and if he has had a hemorrhage, the case is decidedly suspicious. In such a case the sputum should at once be examined, and if the bacilli are found, the diagnosis is quite certain.

The presence in the sputum of elastic fibers shows the destruction of the lung tissue has begun, and is additional evidence of the dread disease. When the disease has progressed suffi-

ciently for cavities to form, the chest to become flat, night-sweats to appear, and emaciation to become marked, the diagnosis is of but little use, as the destructive changes are so marked that but little if any benefit can be expected from medication.

Fibroid Phthisis.—*Definition.*—Fibroid phthisis is that condition where the normal lung tissue is replaced by fibrous connective tissue, resulting in contraction and induration, and where a microscopic examination reveals tubercle. Chronic interstitial pneumonia is now classed as fibroid phthisis, there being no tubercle present, at least not till near the end of the disease.

Pathology.—The replacement of lung substance by connective tissue usually begins in the apex, more rarely in the middle lobe, and gradually extends downward till the whole lung is involved. As the disease progresses, the lung becomes contracted and indurated. As a result of this, the chest of the affected side becomes flat, and the shoulder drops. But one lung may be affected, the opposite fellow becoming hypertrophied as a compensation. There is often dilatation of the larger bronchi and thickening of the pleura.

Symptoms.—The symptoms depend, to some extent, on the manner in which it begins. Thus Clark Hadley and Chaplin describe three forms of the disease: first, a pure fibroid phthisis, where no tubercle exists; second, a tuberculo-fibroid, where the tubercle develops first to be followed by the connective tissue; and, third, the fibro-tubercular form, where the tubercle follows the fibroid change.

Cough is one of the earliest and most persistent symptoms, coming on in paroxysms, and attended by expectoration of a mucus, sero-mucus, or purulent material. The paroxysms are more persistent in the morning. There is but little if any fever. The patient gradually loses flesh and strength. There is some pain in the affected side, and dyspnea follows slight exertion.

On inspection, we notice that the affected side is flat or sunken, and that the shoulder droops. Auscultation reveals a bronchial sound, while percussion gives more or less dullness, the result of induration and the effacement of the air-cells. Where tubercles are present the symptoms are similar, with the addition of a slight fever and a more purulent expectoration. Sweating is not so profuse in the fibroid form as in the ulcerative phthisis, but hemorrhages are more frequent and also more serious. Albumen

is often present in the urine, and dropsy is frequently seen, especially of the feet, and occurs in the later stages. The disease is decidedly chronic, lasting from ten to thirty years.

Diagnosis.—The diagnosis is not always easy. Coming on insidiously, with little or no fever, the disease is not early suspected. The persistent paroxysmal cough, the frequent hemorrhage, the dyspnea on slight exertion, the pain and sinking in the affected side, with drooping of the shoulders, are symptoms that determine its true character.

Tuberculosis of the Serous Membranes.—Tuberculosis of the serous membranes, pleura, peritoneum, or pericardium, may be either primary or secondary, though many times it will be very difficult, if not impossible, to distinguish the one from the other.

Pathology.—The anatomical changes are the same as those that take place in ordinary inflammations of serous membranes, with the addition of tubercular material, distributed throughout the exudations. The effusion is generally fibrinous, changing to a purulent character with the advance of the disease; at times it is hemorrhagic.

Etiology.—This form is acute, is usually the result of local disease of the bronchi, mediastinum, or, if in woman, of the fallopian tubes, inoculation taking place through these parts. If chronic, it generally follows the extension of tuberculosis of some contiguous organ.

The Pleura.—Symptoms.—These will depend upon the form, whether acute or chronic. If acute, the invasion may be sudden and announced by a chill, followed by febrile reaction. The breathing is shallow and attended by sharp, lancinating pains. A short, dry cough adds to the suffering of the patient. The symptoms, in the early stage, are the same as those found in acute inflammation of the membrane.

The chronic form comes on more insidiously, and is the result of extension from the pulmonary lesion. In addition to the general symptoms which have preceded, there is pain of a more or less acute character and a sense of fullness of the affected side. All the symptoms of the combined lesion are now intensified, and the disease runs a rapid course.

The Pericardium.—This form may be acute or chronic, and may occur at any period in life. The morbid lesions are the same

as those just considered. The acute form is rarely primary, and follows an affection of the bronchial or mediastinal lymph-glands. As these glands are more frequently involved in children, this form will be more often observed in young people. The symptoms, either acute or chronic, will be similar to those of acute or chronic pericarditis. In addition, there will be the general and progressive emaciation, together with the destructive changes so familiar in general tuberculosis. This form is not frequent.

The Peritoneum.—This form is usually found as an extension from some adjacent viscera, though in rare cases it is seen as a primary lesion. It is often part of a general miliary tuberculosis, though the chronic ulceration and fibroid are not uncommon. The young are far more susceptible than the old, and it is comparatively rare after middle life, though no age is exempt.

The negro race is more prone to this disease than the white race, and females than males, owing to the frequency with which the fallopian tubes are the seat of the primary lesion.

The disease is very often the result of tuberculosis of the intestines or of the mesentery; again we see it following tuberculosis of the liver and pleura. Peritoneal involvement is not a rarity.

The frequency with which disease of the ovaries and tubes occur, has already been mentioned.

Symptoms.—The symptoms are not unlike those of *tabes mesenterica*; in fact, are often preceded by disease of the intestines and mesenteric lymphatics. They are also those of peritoneal effusion in general.

Among the local symptoms are tympanites, pain more or less intense, tenderness on pressure, and sometimes a well-outlined tumor of a plastic exudation can be outlined.

Among the most prominent general symptoms are emaciation and anemia.

The temperature varies, though usually not very high, while a subnormal temperature not infrequently accompanies the lesion.

Anders regards pigmentation of the skin as a prominent symptom, and one that should early attract the physician's attention to the peritoneal condition. Ascites is frequently present, though the effusion is not often large.

Diagnosis.—Unless the peritoneal involvement is preceded by tuberculosis of some other part, as the pleura, lungs, intestines,

or pelvic viscera, the diagnosis is extremely difficult, especially if the temperature range is nearly normal. If there is a continued elevation of temperature, and a transverse tumor below the transverse colon, with emaciation and anemia, there should be but little trouble in the diagnosis.

Tuberculosis of the Alimentary Canal.—*Of the Lips.*—This is a very rare site for tuberculosis, and when it is, it is usually as an ulcer associated with pulmonary or laryngeal disease. The ulcer is extremely sensitive, and not unlike a chancre or epithelioma. It is only recognized by the aid of the microscope.

Of the Tongue.—This, like the preceding, is usually associated with disease of the larynx or neighboring parts. It occurs as an irregular ulcer at the base of the tongue, though in rare cases the tip may be involved. It closely resembles a syphilitic ulcer, and requires great care in the diagnosis. The salivary glands seem to possess an immunity, though not quite absolute, as cases have been recorded.

Of the Palate.—This is seen in the form of miliary tuberculosis, and appears as a superficial ulceration of the tonsils, which requires a microscopic examination to reveal its true character. Like those just considered, it is commonly associated with tuberculosis of other parts, through the pharynx. In phthisis pulmonalis, during the latter stages, it is not uncommon to have ulceration of the larynx and epiglottis as a complication, and where this takes place the pharynx is nearly always involved. The ulceration is not always extremely painful, but often renders deglutition impossible, and the fluids are returned through the nose. The last days of life are rendered distressing, and the patient literally starves.

Esophagus.—The few cases recorded have been the result of extension from the larynx.

Stomach.—This rarely, if ever, is seen as a primary lesion. It may occur as a miliary or chronic caseous variety. The ulcers may be single or multiple, and involve the mucosa, though perforation has been recorded. The symptoms are pain, nausea, and vomiting, especially after eating. These symptoms may exist with tubercular laryngitis; but if hemorrhage occurs with the vomiting, and there be tuberculosis of the other parts, the probability is that there is tuberculosis of the stomach.

Intestines.—This, in the adult, is nearly always secondary to

tuberculosis of the lungs, about fifty per cent of chronic ulcerative phthisis having this as a complication. In the child, however, it is frequently seen as a primary lesion or following a peritoneal disease. Any part of the small or large intestine may be involved, the ileum being the favorite seat of the location. This variety, together with enteric fever, is the common cause of the ulceration of the intestines. Beginning in Pyer's patches, the tubercles are formed, caseate, turn yellow, and suppurate, forming ulcers. These are irregularly oval, their greater diameter being in the short axis of the bowel.

The symptoms are those of catarrh of the bowels, especially in children; with the diarrhea, there is colicky pain, and the stools consist of blood, pus, and fecal matter. There is fever, and the emaciation is marked. Night-sweats occur, and the evidence of tuberculosis can hardly be overlooked. In such cases the lungs should be carefully examined for tuberculosis.

Tuberculosis of the Liver.—Tuberculosis of the liver is almost invariably secondary to lesions of other organs; namely, of the lungs, pleura, or peritoneum. It is generally of the miliary form, and the distribution is quite general. The liver is pale and slightly enlarged, the tubercles are yellow, both being stained from the bile and necrosis. Hanot describes a tuberculous cirrhosis where the tubercle is entangled in connective tissue and fatty degeneration. "The liver is lobulated and furrowed by fibrous glands, which almost convert it into a lobated liver." If the patient has been a hard drinker, there often is seen the fatty hypertrophic, tuberculous liver, which is characterized first by gastro-intestinal disorders, hyperemia of the liver, cough, fever, and night-sweats, to be followed later by pronounced hepatic disorders.

The diagnosis is made by a careful physical examination of the liver, which will be found to be enlarged, firm, hard, and irregular. Pressure causes pain, ascites may be present, while the symptoms of perihepatitis and peritonitis are nearly always present.

Tuberculosis of the Genito-Urinary System.—The attention of the profession has been directed to the genito-urinary tract in recent years by the surgeon and gynecologist as a seat for tuberculosis. Although rare, it may be primary or secondary, and may be either miliary or caseous. Any part of this system may be

involved, and sometimes the extension is so rapid that the primary seat can not be determined.

Tuberculosis of the Kidney.—Tubercular nephritis is that condition where the tubercle bacilli develop in the inflammatory products, resulting in the formation of tubercular tissue. The inflammation usually begins in the mucous membrane of the pelvis and calices, gradually extending to the parenchyma, till more or less of the organ is replaced by the degenerated material. The tubercle may caseate and soften, or calcification may occur, the intervening space being converted into fibrous tissue. The other kidney is very apt to become involved, if not tuberculous, at least by a low form of nephritis and more or less of degeneration of its tissue and blood-vessels. Tubercular nephritis may be complicated by tuberculosis of other parts of the genito-urinary tract, by tuberculosis of the peritoneum, or, in fact, by tuberculosis of any other part of the system.

Symptoms.—The urine is more or less scanty, and contains, at different times, blood, pus, epithelium, tubercle bacilli, and, when the other kidney is the seat of chronic nephritis, albumen and casts are present. Pain of a dull, aching character over the affected organ may be constant, or there may be paroxysms, occurring at intervals. The kidney may become enlarged, so that the tumor mass may be readily felt. As the disease advances, the general symptoms characteristic of tuberculosis are seen; viz., hectic fever, night-sweats, and general emaciation.

Tuberculosis of the ureters and bladder may be a complication extending from the kidney, but rarely, if ever, occurs as a primary lesion. The same may be said of the prostate gland and vesiculæ seminales.

Tuberculosis of the Testicle.—This form of the disease may be either primary or secondary, and occurs more frequently in early life than in later years. In twenty cases reported by Julian, twelve were under two years of age. Tubercle of the testes is most often confounded with malignant growths and syphilis. A careful examination of the body at large and a complete family history are important, before a diagnosis is made.

Tuberculosis of the Fallopian Tubes, Ovaries, and Uterus.—These organs are usually involved secondarily, although, in rare cases, they are the seat of the primary lesion. This is especially

true of the tubes, while that of the ovary and uterus will always be found in connection with general tuberculosis.

Tuberculosis of the Circulatory Apparatus.—This occurs as the result of the pulmonary lesion, and is not found as a primary disease.

Diagnosis.—If the bacilli of Koch is the real cause of tuberculosis, as generally accepted by the profession, the most certain diagnostic feature would be the finding of the bacilli in the sputum and other excretions. The reaction obtained by injecting tuberculin is also regarded as positive evidence of the presence of tuberculosis.

The family history is of great value in the early stages. The increased temperature, the gradual loss of flesh and strength, the general evidence of malnutrition, the hectic fever, night-sweats, the cough, hemorrhage, and emaciation confirm and render plain the diagnosis.

Prognosis.—While tuberculosis is generally regarded as one of the incurable diseases, we are to remember that it is not necessarily fatal; that the presence of the bacilli does not mean that tuberculosis has become an established fact. These micro-organisms may gain entrance into the system, but, failing to find a soil suitable for their propagation, are cast out, and but little harm results.

Post-mortem examinations have revealed again and again the presence of healed foci, showing conclusively that persons have recovered from tuberculosis. When, then, may the prognosis be favorable, and when unfavorable? Certain forms are less destructive, and the prognosis may be quite hopeful.

Tuberculosis of the lymphatics and also of the osseous system do not seem to possess the virus in such a malignant degree as other forms, and the tendency is often toward health. Tuberculosis of certain organs which can be removed by the surgeon, may be permanently relieved, such as bone affections, the mammary gland, the ovary, the uterus, the testicle, and glandular enlargements. These may be said to be the hopeful cases. Also when the family history is of good report and the previous health of the patient has been good; when digestion and assimilation are first-class and the elaboration of a good blood is going on. With these conditions the germs fail to make headway, and the prognosis is good. Also where the temperature remains normal or

rises for but a short time each day, and where there is no hemorrhage.

An unfavorable prognosis would be where the conditions were just opposite to those above mentioned. Bad family history, gradual and progressive debility, feeble digestion and assimilation, hemorrhage repeated at intervals, cough more aggravated at night and early in the morning, and rapid emaciation,—these are conditions which would be recognized as unfavorable and almost necessarily fatal, especially where the environments are bad.

Treatment.—*Prophylaxis.*—If the generally accepted theory is true, that the *bacillus* is responsible for the disease, then all will agree that the destruction of the micro-organisms is one of the most important steps in preventing, not only the further spread of the disease, but also in limiting its ravages where it already has a foothold, thereby preventing reinfection.

It has been estimated that a patient suffering from pulmonary tuberculosis will expectorate, during the twenty-four hours, about seven billion of the bacilli; this from a patient who is still able to walk about and mingle with his fellow-men. The disgusting habit of expectorating on the floors of rooms, street-cars, and public buildings and sidewalks, should be discouraged by every means possible. The danger from this source should be taught in every school, and the children be impressed with the fact that herein lies one of the greatest menaces to the human family; for this is the one disease that is the scourge of humanity.

Patients confined to the house should be provided with spit-cups that can be easily cleaned or burned. If walking about, Knopf's pocket sputum-flask, made of aluminum, is very desirable. The sputum, when not burned, may be treated with a five per cent solution of carbolic acid, which successfully destroys the germs in thirty seconds. All utensils for sputum and secretions should be thoroughly boiled or cleansed with this acid solution.

Spitting in the handkerchief should also be discouraged, unless they are Japanese paper handkerchiefs and are immediately burned. Patients should also be instructed not to swallow any of the sputum, and thus avoid reinfection. Consumptives and all delicately inclined should avoid smoking, as there is danger in the virus coming from the consumptive cigar-maker, whose saliva is used to point the cigar. Dr. J. C. Spencer, of San Francisco,

has demonstrated the presence of bacilli in various specimens of cigars, and though the nicotine may kill the germs it has also been proven that the dead bacilli contain a specific poison which is still capable of doing harm to the tissues.

Milk being a common source of infection, should be boiled or sterilized before use by the tubercularly inclined patient. The same may be said of tubercular beef; it should be thoroughly cooked. Kissing should be discouraged among all phthisically inclined, for while the virus is generally found more virulent in dried sputum, the breath from any diseased person can not be said to be health-producing. Where the sewage is defective, the excretions should be treated with carbolic acid solution before being emptied in a vault or even buried in the ground.

Delicate babies should not be intrusted to a wet-nurse unless it is known that she is perfectly free from tuberculosis; neither should they nurse from a tuberculous mother. Those phthisically inclined should live much in the open air, and all indoor occupations should be discouraged; also such trades where fine particles of dust are inhaled. Delicate children should be carefully guarded during the convalescent period of infectious disease, as the danger of tubercular infection is much greater at this time.

The diet should be wholesome, and sweetmeats, pastries, etc., should be restricted. Such exercise and gymnastics should be encouraged as develop the respiratory muscles and increase lung capacity.

To avoid frequent colds, the throat and neck should be bathed in cold water daily, followed by brisk rubbing with coarse towels. When possible, the sleeping apartment should be roomy and well ventilated, and the patient should sleep in a single bed. A change from the city to the country, or, better still, to a high and dry altitude or to an equable climate, is to be recommended where such advice can be followed.

In selecting a change of climate, one should go where there is a maximum of sun and a minimum of moisture, and where the temperature is equable. Such a climate is ideal for the tubercular patient. He must be much in the open air. Such a climate may be found in Arizona, New Mexico, and Southern California. Colorado has also earned a well-deserved reputation for respiratory diseases. Many are permanently benefited by a sojourn in the Adirondacks, while the mountains of the Carolinas and

Georgia have proved curative. Texas, with its wide extent of territory, furnishes sections where tuberculosis is unknown and where patients recover.

Where, with such a wide range of territory, shall we send our patient? This is not always easy to determine. If the patient be fairly robust, the Adirondacks will be ideal, as will be Colorado; if more delicate and less able to resist shock, the sunny, dry, and equable climate of New Mexico, Arizona, or Southern California, will be more desirable. In fact, much depends upon the effect that the climate has upon the individual. If it improves the appetite, enables the patient to sleep, and invigorates generally, and the patient increases in flesh, he has found his climate, and should abide there; if, on the other hand, there is no gain in flesh, the patient sleeps poorly, and the appetite is not increased, he must move on; but wherever he goes, he must be much in the open air.

After cavity formation, hectic fever and night-sweats appear, the patient should not be allowed to leave home, as the change usually hastens the fatal termination, and, besides, depriving him of the comfort and pleasure of home and friends during his last hours.

Treatment of the Disease.—The treatment of tubercular patients will depend largely upon the stage of the disease. In the earlier stages our object would be to improve the general health, and get a better elaboration of blood; in other words, to raise the vital force of the individual to such a point that the soil will not grow or develop the poison or germ, and in this way bring about a cure. Thus it is a question of nutrition.

Hygienic measures will form a great aid in the curative action of remedies; for I believe that very many cases, if seen in the early stages, can be cured. The treatment is usually quite plain. A *little* medicine; plenty of pure, fresh air and sunshine; gentle exercise, not enough to produce weariness; a tonic for the digestive apparatus; means to establish the secretions; a remedy for the cough,—and the patient, if curable, will soon show the effects of the treatment.

One great axiomatic truth that the physician should never lose sight of, is that any remedy which disturbs the stomach should at once be withdrawn. A good appetite and a good digestion are requisite for improvement; hence codliver-oil should seldom be

prescribed. Once in perhaps a hundred cases, will you find a patient who can take codliver-oil and not disturb his stomach, and for such patients this remedy is permissible. Nevertheless I am inclined to believe that good, sweet breakfast bacon, and the fat of beefsteak and roast-beef, will prove just as efficient as the oil, and is at the same time not only more palatable but more easily assimilated.

Creosote is another agent which must be carefully administered or gastric disturbance will follow, which will be far more harmful, than the slight benefit derived from the remedy.

Arsenic is one of the agents which we will very early administer in the disease. Fowler's solution, twenty drops in four ounces of water, a teaspoonful every four hours, will prove of great benefit.

Veratrum.—These two remedies, Fowler's solution and veratrum, were almost invariably used by the late Dr. A. J. Howe. His method was to give arsenic one day and veratrum the next, and his success with these remedies was very marked. Veratrum is given in this case, not as a sedative, but for its alterative effect, there being few better remedies.

Nux Vomica and Hydrastis will be found useful where the appetite is poor and digestion feeble.

Howe's Acid Solution of Iron.—Where an acid is indicated,—red tongue, and mucous membranes,—drop doses of this preparation three times a day, will be found beneficial. It sharpens the appetite, and tends to arrest the excessive waste of tissue.

Cough.—The cough is one of the most distressing features of the early disease. Stillingia liniment in drop doses is very effective in relieving this troublesome symptom. A drop on a lump of sugar every one, two, or three hours, will secure rest from cough, and also restore the voice. In some cases it will give better results used as an inhalation. Squeeze a sponge out of hot water, and drop a few drops of the liniment upon it, and then hold over the mouth.

If there is pleuritic pain with the cough, bryonia will be found useful. In the later stages, codein and ipecac will give relief, but heroin, one-twelfth grain, every three, four, or five hours, will prove the most successful in the advanced cases.

For the fever, frequent sponging with warm water, and, incidentally, the indicated sedative should be given.

Night-Sweats.—Aromatic sulphuric acid, from ten to thirty drops at bedtime, is found useful. Also 1-100 grain doses of atropia. Camphoric acid in twenty-grain doses has proven quite beneficial. Picrotoxin in 1-60 grain doses may also be given with benefit.

Diarrhea.—Subnitrate of bismuth in mint-water, or the subgallate bismuth with opium, will prove reliable agents for this troublesome complication.

Hemorrhage.—Gallic acid in five-grain doses is a very positive agent. Where the hemorrhage is of a passive character, give carbo-veg.; oil of cinnamon on sugar, or equal parts of cinnamon and erigeron, are remedies which will be of certain benefit. *Mangifera indica* is another excellent agent in passive hemorrhage.

The diet should be carefully selected. Milk, in some form, should be taken liberally. One patient will do well on sweet milk, another on buttermilk, while a third will need koumiss. Eggs may be taken freely. Where fats can be taken and digested, they should form a part of the patient's diet. A change of air or a sea-voyage, where the patient is able to comply with such a prescription, is the best tonic.

SYPHILIS.

Synonyms.—Pox; Mal-Venerean; Lues Venerea.

Definition.—A specific infectious disease, weeks or months being occupied in its development; contracted by inoculation,—acquired syphilis, or hereditary,—congenital syphilis, and characterized by three distinct stages: *Primary*; *Secondary*; *Tertiary*.

Primary Stage.—This stage is characterized by the appearance of the initial sore or chancre at the seat of inoculation, in from twenty to thirty days after the introduction of the virus, and lasting on the average about six weeks.

Secondary Stage.—In this stage, constitutional symptoms occur in from sixty to ninety days after the primary lesion, in the form of fever, cutaneous eruptions, ulcerations of mucous surfaces—especially of the mouth, tongue, and throat, loss of hair, and frequently iritis.

Tertiary Stage.—This stage is characterized by inflammatory products, gummata, which develop from the third to the sixth year, and last from one to twenty years, or a lifetime, and which appear in the skin, muscles, the various viscera, and in the bones.

History.—In all probability, syphilis is as old as the human race; for we can readily believe that illicit intercourse was practiced in the cities of the ancient world when the morals of the people were more lax than those of to-day. Our knowledge of this disease, however, dates from the fifteenth century. Breaking out among the troops of Charles VIII, King of France; it rapidly spread over Europe. From then to the present day our knowledge of the disease has grown, till to-day we are able to classify and separate the various lesions resulting from illicit and promiscuous intercourse. All forms of venereal disease were included under the name of syphilis till Ricord, in 1831, demonstrated to the profession that gonorrhea and syphilis were two distinct lesions.

Etiology.—Predisposing causes are injuries or abrasions of the mucous surfaces of exposed parts, for the disease can originate in only one way, by inoculation.

The primary cause is now regarded, generally, as a bacillus, though the claim of Lustgarten and Van Neissen as discoverers of the syphilitic bacillus has not been verified. The contagion resides in the blood and morbid products of the individual suffering from syphilis. It reproduces itself for months and years, and, while it grows less malignant with age and finally loses its infecting principle, we have not yet been able to determine that fortunate period of time. In some it may remain for life.

The contagion can not be transmitted to the lower animals, man being the only animal subject to this loathsome and degrading disease. One attack generally renders one immune, though not always, and a mother who has borne a syphilitic child becomes immune, though there be no visible proofs of the disease, and she may handle or suckle a syphilitic baby with impunity.

Modes of Infection.—There are three modes of infection: 1, Illicit intercourse; 2, Heredity; 3, Accidental.

Illicit intercourse is responsible for the great proportion of cases, though the patient declares that it has occurred accidentally. The lustful gratification of the passions is perhaps responsible for seventy-five per cent of all cases of syphilis.

Accidental.—Kissing.—The reprehensible and general habit of kissing is responsible, not only for diphtheria, scarlet fever, and a host of other contagious diseases, but also for this plague of the world, and lip chancre is not uncommon.

Nursing.—A syphilitic wet-nurse may convey to her charge the disease, or the babe may infect through the nipple her nurse. The physician who is called to treat all classes of patients may, through an abraded finger, receive the infection while administering to a patient in confinement.

A very rare, though possible cause, would be through shaving, or the use of the thermometer, though the stropping of the razor makes this very unlikely, and the wiping and dipping in cold water each time after taking the temperature would also seem proof against contagion by this means. Recently there has been quite an agitation for individual communion-cups in the religious rites of administering the Lord's Supper, to prevent this and other diseases. I am inclined to believe that such tales by patients are to hide their own lust and indiscretion. Neither am I inclined to believe that vaccination has been such a prolific source of the disease, although I admit its possibility. Dr. Robert Cory, chief vaccinator to the National Vaccine Establishment, England, in his experiments, as recorded in Keating's Encyclopedia of Children, showed how little danger there is from vaccination.

Dr. Cory believed it impossible to convey syphilis by vaccination; to prove which, he repeatedly vaccinated himself from children who were plainly and actively syphilitic. A number of these were barren of results, but finally, on July 6, 1881, he was not so fortunate in escaping. He vaccinated himself in three places from the lymph taken from a three-months old child that had eruptions and sores which were evidently syphilitic. In three weeks syphilitic papules appeared at the seat of two of the punctures, and were followed in due time by sore throat, roseola, and other positive evidence of constitutional syphilis,—thus proving that, while it is *possible* to acquire syphilis by vaccination, it must occur very rarely in active practice.

Hereditary Transmission.—In hereditary transmission, nature plays some queer and unexplainable pranks. Two conditions are so well known that they have come to be recognized as established laws: Profeta's and Colle's,—the former, in which syphilitic

parents beget a healthy child, the offspring acquiring immunity during gestation, which protects it from either parent; the other, Colle's law, is where a mother bears a syphilitic child, and she herself becomes immune, and can not be infected, even though she presents no signs of the disease.

The most frequent form of transmission is from the father, the mother being free from infection. This is known as sperm infection. Here, again, we see strange results; for a decidedly syphilitic father may beget a healthy child, while, on the other hand, a man, who may have had syphilis in his early life, but apparently had recovered after treatment, not presenting a single phase of his old trouble for years, may transmit to his offspring the characteristic lesion of the disease.

The earlier the offspring is begotten, after the appearance of the primary sore, the greater the danger from infection, while, under judicious treatment, the danger is but slight after four years. The more remote from the initial lesion, the less the danger, and a parent suffering from tertiary lesion may beget a healthy child.

Infection from the mother, known as germ infection, is also quite common, the father being free. In most cases, however, both father and mother are infected, the latter by the former; in which case the child is very apt to show infection.

Where the mother becomes infected after conception, the offspring may show infection, when it is known as placental transmission.

Pathology.—Chancre.—The initial lesion consists of an infiltration of small round cells, together with larger epithelial cells, giant cells, and the bacilli of Lustgarten. The inflammatory process causes thickening, and sometimes obliteration, of the smaller arteries and veins, which give rise to sclerosis. This is soon followed by degeneration of the epithelium, causing the small, round, shallow ulcer about the size of a split pea, the hard, indurated convex surface forming its base. The near lymphatics are soon involved, becoming infiltrated and indurated, which in turn may caseate and break down.

Secondary Lesions.—The most common are ulceration of mucous surfaces and cutaneous eruptions. The favorite location for mucous patches is the mouth and anus. They vary in size

from a pin-point to a half-dollar, their edges being slightly indurated. Iritis is quite a common attendant.

Tertiary Lesion.—Inflammatory products, known as gummata, characterize the third stage. These bodies are made up of round cells, and vary in size from that of a millet-seed to that of a walnut. They are found upon the bones and periostium, and called nodes, or they may be found in the skin, muscles, liver, kidneys, lung, heart, brain; in fact, in any of the viscera of the body. Usually they are firm and indurated, though in the skin and viscera they may break down, forming ulcers.

A cross section of one of these products reveals a grayish white mass, firm in consistency, the center being caseous, while the outer border consists of translucent, fibrous tissue.

Acquired Syphilis.—Primary Stage.—The period of incubation, or the time from exposure to the appearance of the initial lesion, the chancre, is from three to five weeks, the average time being from twenty-eight to thirty days. The first evidence is a small red papule, which early reaches its full development, then undergoes central necrosis, giving rise to the ulcer. The outer edges become indurated and feel like cartilage; hence the name, "hard chancre." The glands in the near neighborhood become enlarged and indurated, to be followed by general glandular infection; next in order are those of the axilla, to be followed by the cervical and occipital. If the chancre be located in the urethra and is small, it may escape detection. During this stage the general health is not impaired.

Secondary Stage.—This is usually announced by a light fever, from six to twelve weeks after the appearance of the initial lesion. Generally the fever is not very high, 103° or less, although occasionally it may reach 104° or 105° . The patient complains of headache, muscular pains, loss of appetite, impaired digestion, and loss in weight. There is anemia, more or less pronounced, while the color becomes a dirty yellow, the well-known syphilitic cachexia.

Ulceration of the mouth and throat early appears in the form of white patches. On the tongue they may be ragged and irregular in appearance, with a firm base. There is usually but little pain from this source. About this time the rash, syphilitic roseola, appears upon the trunk, being profuse upon the chest, arms, and forehead. In color they are a dingy red or copper. It is not

only a hyperemia, but also an infiltration, and when the finger is passed over them, there is a distinct sensation of their infiltrated character. This usually lasts from a few days to two weeks, though in exceptional cases it is present for months.

The papular syphilide may follow in order or appear simultaneously, or may appear without the roseolous rash having preceded it. The papules are found in the scalp, face, and body, and vary in size from that of a pinhead to that of a pea. They are firm, hard, and painless. Following this we may have the squamous, the vesiculo-papular, pustular, and tubercular. These may follow in order or be developed independently of each other. There may be fissures or mucous patches about the anus, vulva, or vagina, that occasion a great deal of discomfort to the patient.

Alopecia is one of the frequent, and, to the patient, deplorable conditions of this stage. Not only loss of hair from scalp, but the hairs of the eyelids and brows may also drop out, giving the patient a ludicrous appearance, and one to be dreaded. Iritis is not an uncommon condition of this stage.

The secondary stage may disappear in two or three months, or it may occupy a year or more in its various evolutions.

Tertiary Stage.—It is impossible to draw the dividing line between the various stages of syphilis. Usually some time elapses between the second and third stage, sometimes years intervening, during which time the patient will experience a season of health. At other times the tertiary lesions appear before the secondary have passed from view. These are the later syphilides, gummata, and amyloid degenerations.

The eruptions in this stage are more irregular and involve deeper tissues. Rupia, the most characteristic, is covered by dry crusts, beneath which are the ulcers involving the skin and deeper tissues. These are slow in healing, and leave behind a cicatrix, a constant reminder of man's indiscretion.

Gummata may develop in the mucous membrane, skin, subcutaneous tissues, muscles, viscera, brain, cord, and bones. Where they develop superficially, ulceration and cicatrization occur. In the muscles they develop as tumors. In the viscera they undergo fibroid degeneration, attended by puckering and more or less deformity, thus impairing their function. They appear as nodes on the bones, the tibia and skull-bones being the favorable locations. These are painful to the touch, and with the approach of cold

weather the patient desires to toast his shins, to relieve the chill and ache which attend these changes. The pains are worse at night.

Where the deposits are in the brain, they are usually located near the surface and are generally attached to the dura or pia mater. They vary in size from that of a pea to that of a walnut. A cut section reveals a mass, caseated and surrounded by a fibrous tissue. Where these masses come in contact with the meninges, meningitis almost invariably follows.

While gummata may appear in the cord, it is far more rare than in the brain. The arteries becoming occluded, arteritis follows. These lesions of the brain are usually slow in developing, years elapsing after the initial lesion. Persistent headache, resisting the ordinary treatment, should call attention to the nature of the trouble. Delirium may follow or precede the neuralgia. Dizziness is often encountered, and vomiting is a common attendant. Following a lesion of the cord, locomotor ataxia is the most serious result.

Gummata of the digestive tract throughout its entire course is not uncommon, though the deposits may be found in any portion. The orifices are the most frequently affected; in fact, they rival the skin in evidence of their presence.

The lips, mouth, and pharynx have already been mentioned as being the first to feel the force of the poison. Deposits in the esophagus, though not frequent, give rise to stricture. The selection of the stomach and intestinal tract for the deposit is quite rare, though the last inch of the bowel is a favorite site for the deposit. Like that of the esophagus, stricture is apt to result.

Liver.—The liver may be the seat of either diffuse or circumscribed deposits. The kidneys may also be involved. When the heart feels the force of the poison, we find warty excrescences, producing endocarditis. Deposits may also take place on the valves.

The respiratory tract is also invaded by this foe of the human race, the nose in rare cases showing the characteristic deposit. The larynx, as well as the trachea and bronchi, are occasionally involved. The lungs prove no exception to the general rule, the deposits usually selecting the middle and lower lobes rather than the apices, as in tuberculosis.

Testicles.—The gummatous deposits frequently select the

testes as a fruitful soil for a display of their action, forming indurated masses in the body of the organ. The gland is swollen and enlarged, though but little painful. There is but little tendency to degeneration. The location of the deposit enables one to recognize it from tuberculosis, which seeks the epididymis as a nesting-place.

Congenital Syphilis.—The same conditions, expressed by similar symptoms, are to be found in congenital as well as in acquired syphilis, with the exception of the initial lesion, the chancre. The disease may show its characteristics while yet in utero, at birth, a few weeks later, or at puberty. The lesion will be considered in this order.

In Utero.—That the fetus feels the force of the virus while yet in utero, and shares in its destructive power, is seen in frequent abortions and the presence at birth, or a few days later, of bullæ on the hands and feet, pemphigus neonatorum.

There are changes that take place in the viscera, and, though rare, are corroborated by such men as Gubler, Roehenbrome, Barensprung, and others. Hutchinson says: "Of these, a parenchymatous infiltration—fibroplastic—of the liver, for the most part without large gummata, is the most common. It is sometimes attended by anasarca, and similar lesions occur in the lung. If not actually present at birth, it may develop soon afterwards, and may then lead to jaundice and death.

Infiltrations of the same kind may be found also in the spleen, the kidneys, the thymus gland, and even in the heart. Occasionally larger and more circumscribed deposits are found, and sometimes softening occurs and abscesses form. These pathological processes occur chiefly during the later period of intra-uterine life, and are no doubt responsible for the majority of cases being born dead at, or near, full time. They may also occur during the first few weeks of life. At this age jaundice is sometimes observed, and is a symptom of great danger.

As a rule, these early manifestations of the disease result in death, either at birth or at an early period, the number surviving being very small.

At Birth.—While the majority of syphilitic babies are born apparently healthy, being rosy and plump, the visible effects not appearing till the end of the fourth week, a certain number come into the world with the characteristic syphilitic cachexia. Their

puny, feeble, emaciated bodies put so great a handicap upon them in the battle for existence, that few survive the struggle but a few weeks. The sallow or jaundiced skin is wrinkled and flabby, giving the child a prematurely old look.

Snuffles render the respiration difficult, the child breathing through the mouth, and frequently interfering with the child's nursing. Ulcers and fissures appear at the orifices of the body, especially at the mouth and anus. With the exception of pemphigus neonatorum, skin eruptions are rare. There is generally enlargement of the liver and spleen. Disease of the bones is often seen, with separation of their epiphyses.

Early Manifestations.—After four, six, or eight weeks of apparent robustness, the child develops a nasal catarrh, syphilitic rhinitis, which greatly interferes with nursing and respiration. This condition, known as snuffles, is attended by a muco-purulent or bloody secretion. This may be followed by ulceration and necrosis of the nasal bones, resulting in a depression at its base, which is characteristic of congenital syphilis. The catarrh may extend to the middle ear, giving rise to otitis media, followed by deafness and otorrhea.

The cutaneous symptoms early make their appearance, usually about the nates, either as an erythema, eczematous patches, or papules. They are of the characteristic coppery color. With these several symptoms the hair on the head and eyebrows may fall out, while the finger-tips become red and inflamed, and the nails finally separate and fall off. Ulcers or fissures about the mouth now make their appearance, the discharges from which are highly infectious, and, if nourished by a wet-nurse, transmit to her the disease. Other members of the family also may become infected by kissing and fondling the babe.

The spleen is usually enlarged, as may be the liver, though this is not characteristic. There is not so apt to be glandular enlargement in this as in the acquired form. The child becomes restless, sleeps poorly, and has a sharp, shrill cry, due partly to pain, and partly to obstructed respiration.

Later Developments.—The child may seemingly recover from these early lesions, and for a time seem to have outgrown the effects of his early troubles; but during second dentition or puberty the old trouble again reappears. Development is arrested

II

III

PLATE IX SYPHILIS.

I. Gummata of the forearm. II. Onychia of thumb and forefinger, in the form of mucous patches affecting the matrix of the nails. III. Syphilitic ulceration of the tongue. IV. Syphilitic ulcer of the soft palate.

or retarded, and the child takes on a shriveled or withered appearance, and presents a stunted growth.

The brain is so unfavorably impressed by the infection, that proper development is retarded, and the patient retains childish peculiarities after reaching manhood. The testicles are atrophied or infantile. The forehead is prominent, the frontal eminences project, and the skull is asymmetrical. This outward appearance resembles that produced by a combination of tuberculosis and rickets, which results in slow development, emaciation, and a jaundiced appearance. Dentition is delayed, and is characteristic, the Hutchinson teeth being peg-shaped and notched, the dentin being revealed at the notch.

Keratitis develops first in one eye, then in its fellow. This begins as a hazy condition, and may result in permanent impaired vision, or, after a long period, may gradually clear up, with a complete restoration of sight. Iritis also frequently occurs.

Incurable deafness may now develop, together with otorrhea. These three conditions, *teeth, eye, and ear lesions*, have been termed the triad of Hutchinson.

General Diagnosis.—In making our diagnosis, we are to remember that direct questioning will give negative results, for if we ask the patient, "Have you had syphilis?" the almost universal reply will be an emphatic denial. Man's veracity, therefore, may safely be questioned when syphilis is the subject of interrogation. To obtain much information from the patient requires some tact on the part of the physician.

In place of the direct question, "Have you had syphilis?" carefully question as to pimples (papules), eruptions in general, falling of the hair, sore throat, mouth, or tongue. Examine throat, mouth, and tongue for old cicatrices, and the occipital region for enlarged glands; also the groins; inspect the shins for old scars or nodes. When eruptions are present, inquire as to pruritis, if any, bearing in mind that syphilitic eruptions rarely itch. We are not to forget, however, that associated with the characteristic eruptions there may be eczema, with its accompanying pruritis.

In women, repeated abortions may throw some light on the case. In congenital syphilis, the characteristic snuffles the first few weeks, and the eruption, together with fissures and ulcers of the mouth or lips, will be conclusive evidence. When the symp-

toms are delayed till second dentition or puberty, the general cachexia, and the childish appearance and actions, which do not correspond with the age of the patient, the imperfect development of the subject, the Hutchinson teeth (peg), keratitis, and otitis are symptoms that can not be overlooked.

Prognosis.—The prognosis is more favorable than in former years, and, with judicious treatment, the ravages of former times are not seen. The congenital form does not yield so readily to treatment. The vitality seems to have suffered so severely that the frail body is unable to resist the inroads of the virus, and the weakling succumbs to the inevitable in a large per cent of the cases.

Treatment.—My experience in venereal diseases has been quite limited, and I will give the remedies as used by our school. About the only mercurial remedy we give is the small amount found in Donovan's solution. Other than this we believe patients do far better without the mercurials, and are satisfied that much harm has been done in their administration.

Berberis aquifolium is an agent of undoubted value in this trouble, Dr. Webster regarding it as a specific. Under the judicious administration of this remedy, the patient's appetite is improved, the loss of flesh and strength is arrested, and the visible evidences of the disease disappear. If you do not impress your patient with the necessity of taking the remedy for a year or more, however, you lose the early effects by its reappearing.

Syphilis is a disease which needs medication constantly for a year and a half to two years, if we wish to avoid the tertiary manifestations. *Thuja* was used quite extensively by Dr. Goss, both internally and locally. *Corydalis formosa* is also a great remedy with Eclectics; to prevent the severe lesions of the tertiary state there are few agents of equal value. It may be given singly or combined with *berberis aquifolium*. The old compound syrup of *stillingia* and iodide of potassium was a favorite with the fathers in the tertiary stage, and it would be difficult to persuade some of our older members that the iodide of potassium in ten-grain doses, minus the *stillingia*, would be nearly so efficacious.

Echinacea, in half teaspoonful doses, gradually increasing the dose to a teaspoonful, is also an excellent remedy. The iodide of potassium may be given in combination with *stillingia*, *corydalis*, or *berberis aquifolium*. The remedy is to be used in the tertiary

stage. As to the local treatment, I am not in favor of escharotics. You may destroy, by an escharotic, a chancre, but remember that the poison is doing its work in the system at large, and nature is using the local manifestation as a waste-gate. Dress it with boracic acid and hydrastis, or touch it with a saturated solution of thuja. Where the ulcers or chancres are beneath a contracted foreskin, make a free incision, allowing the foreskin to roll back and bring into view the local trouble; after this a free use of warm boracic acid solution will be beneficial. The parts may be dusted with boracic acid and hydrastin. The parts must be kept clean and free from pent-up secretions.

DENGUE.

Synonyms.—Break-bone Fever; Dandy Fever; Broken-wing Fever.

The fanciful and grotesque names which have been used in naming the disease prove its variable character.

From the intense character of the pain, it received the most common and suitable term, break-bone fever; while the peculiar gait of the patient, owing to stiffness of the joints, gave him a grotesque appearance; hence he appeared like a "dandy," dengue being a Spanish corruption, no doubt, of dandy.

Definition.—An acute, specific, infectious fever, occurring epidemically in tropical and subtropical climates, and characterized by two severe paroxysms of fever, separated by an intermission, great muscular and arthritic pains, and attended usually by an eruption.

History.—Brylon was the first to recognize and describe the disease, which occurred as an epidemic in Java in 1779, and which he termed articular fever. In 1780 it appeared in Philadelphia, and was accurately described by Benjamin Rush. From 1824 to 1828 it prevailed at intervals in India, the West Indies, and Spain. It has occurred at intervals in our Southern States and along the Gulf Coast, the last visitation being in 1897. While usually confined to the South, it has occurred as far north as Philadelphia, New York, and Boston.

Etiology.—The nature of the infection or contagion is not yet known, though McLaughlin, of Texas, has isolated and cultivated

a micrococcus which he believes is responsible for the disease. That it is infectious is shown by the rapidity with which it spreads when once it invades a section.

Thus, in 1885, within a few weeks, sixteen thousand out of a population of twenty-two thousand, in Austin, Texas, were stricken. Neither age, sex, race, nor position exert any influence in staying the disease, all classes suffering alike.

Pathology.—As few cases prove fatal, but little opportunity has ever been given to study its pathological character. There has been found infiltration of the tissues about the joints, somewhat resembling rheumatism, but not enough is known to speak definitely of the morbid anatomy of the disease.

Symptoms.—After an incubating period of from three to four days, in which there are few, if any, prodromal symptoms, the disease is ushered in with a chill in the adult, and quite frequently by convulsions in children. There is a rapid rise in the temperature, the fever registering 104° , 105° , or 106° at the end of the first twenty-four or forty-eight hours. The pulse and respiration are quickened in proportion to the elevation of the temperature; the face is flushed, eyes injected, tongue coated, and there is nausea and sometimes vomiting. The pain in head, back, and limbs is of an intense character; the patient's complaint is as though his back and limbs would break; hence the term break-bone fever.

The joints are red, slightly swollen, and stiff; there is also general muscular soreness. Although the temperature is extremely high, there is rarely delirium or unconsciousness to relieve the excruciating pain. The lymphatics become painful and swollen. There may be diarrhea, though the bowels are usually quiet; the urine is scanty, though non-albuminous.

The primary fever lasts from three to five days, during which time a rash, varying in character, appears, though not in all cases. It may be scarlatinal, rubeolar, herpetic, papular, etc., and is usually followed by desquamation. This primary fever is followed by an intermission of two or three days, attended by great relief, though there is soreness and stiffness of the joints, the patient exhibiting the peculiar gait already mentioned. In some cases the temperature becomes subnormal, while in others there is only a remission.

In from two to five days a secondary fever occurs, whereupon all the symptoms of the primary fever are re-enacted, though usually in a less aggravated form. This secondary fever is of shorter duration, lasting only two or three days. It is also attended by the same rash as the primary.

Although the duration of the fever is only from seven to ten days, convalescence is apt to be slow and quite protracted. The prostration that follows a severe attack is very marked, the patient being unable to do severe mental or physical work for weeks.

Diagnosis.—When prevailing as an epidemic, and especially when it is of a severe type, there is but little difficulty in establishing a diagnosis. The sudden onset, high temperature, excruciating pain in muscles and joints, and the appearance of the eruption, leave but little doubt. In sporadic cases it may be mistaken for inflammatory rheumatism, but a careful study will soon show the distinguishing features of each.

Another disease likely to be confused with dengue is la grippe. The onset, the marked myalgia, are similar in each, but there the similarity ends.

Prognosis.—It is rare for a case to end fatally, only those of advanced age or persons of feeble vitality succumbing to its influence.

Treatment.—The disease being self-limited, the object of our treatment will be to reduce the febrile state, allay the intense pain, and render the patient as comfortable as possible. Rest in bed should be emphasized, and the diet should be fluid in character; milk and rich broths being best suited to sustain the patient's strength.

For the high fever, use the wet-sheet pack, assisted by veratrum, if the pulse be full and strong, and combined with gelsemium where there is great nervous irritation.

For the myalgia, macrotys, rhamnus californica, and bryonia will be used, and for the lymphatic involvement phytolacca will be the remedy.

Jaborandi may be useful during the active stage of the fever.

Of course, quinia will be used if the patient resides in a malarial section and if periodicity exists.

THE PLAGUE.

Synonyms.—Bubonic Plague; Pestilence, or Pest; Black Death; Plague of Egypt.

Definition.—A specific, infectious, and contagious disease of peculiar intensity, rapidly running its course, and characterized by inflammation of the glands (buboes), carbuncles, ecchymoses, and petechiæ upon the surface. It is endemic on the eastern coast of the Mediterranean Sea and the Oriental countries adjacent. Epidemics occur when it spreads to other parts of the world, traveling along the great thoroughfares of travel and commerce.

History.—The plague is a very old disease, and probably epidemics raged and devastated peoples centuries before we had any authentic accounts. Sacred and profane histories speak of pestilences which ravaged the Valley of the Nile and the Plain of Philistia. Greece was severely visited, and Athens lost nearly a third of her population four hundred years B. C. Many believe that these "visitations" were none other than the plague.

The earliest positive knowledge that we have of the disease dates from the epidemic which occurred in the sixth century, beginning in Egypt in 542, and extending to Palestine, Syria, and Persia; passing thence into Asia Minor, then on into Europe, carrying off, at Constantinople, ten thousand victims in one day (543 A. D.). Becoming pandemic, it spread in every direction. It is estimated that fifty per cent of the inhabitants of the Eastern Hemisphere died, either directly or indirectly, from this great epidemic before the close of the sixth century.

The next great epidemic was the irresistible march of the "Black Death" during the fourteenth century. Beginning in the East, it spread throughout Armenia, Asia Minor, Egypt, Northern Africa, and nearly all of Europe. It is estimated "that one-fourth of the population, or *twenty-five millions*, perished as a result of this epidemic or pandemic in Europe." (Hecker.)

The seventeenth century witnessed its ravages in London, 1664, where seventy thousand, or one-third of the population, succumbed to the dread plague. Many epidemics have occurred since then, attended with the usual mortality, but there has been no great pandemic since 1664, unless the epidemics during the early parts of the eighteenth century be included. Interest in this disease has been renewed since the outbreak at Hong-Kong in

1894, when twenty-five hundred deaths resulted. In 1896 it broke out in the Bombay district, where, according to Wyman, there were two hundred and twenty thousand, nine hundred and seven cases, with a mortality of over one hundred and sixty thousand.

In 1899, China was invaded, and also Europe. In October, 1899, the plague appeared in Brazil, according to Wyman, the first instance of its appearance in the Western Hemisphere. In 1899, two cases appeared on board the British steamship, *J. W. Taylor*, at quarantine off New York; but owing to prompt and vigorous action of the officials, the disease was not permitted to spread. During 1901 a few cases appeared in the Chinese quarters at San Francisco, but prompt measures on the part of the Sanitary Department prevented its further progress.

This disease has aroused an interest never before felt in America since our new possessions, Hawaii and the Philippines, have been so severely visited. In 1899 and 1900 the disease broke out in Honolulu and Manila, but, thanks to the vigorous action on the part of the military authorities, the disease was not allowed to assume alarming proportions.

Etiology.—Predisposing causes are poverty and filth. The more wretched classes are compelled to live in closely crowded quarters, where but little, if any, attention is given to sanitary measures. As a result, the inhabitants, weakened by their environments and vices, early succumb to the infection, which rapidly multiplies in so favorable quarters.

Soil and season also influence its spread; for low, marshy tracts and hot weather favor its propagation, though it has occurred in mountain heights, and in cold weather.

Exciting Cause.—To Kitasato belongs the honor of discovering the specific cause, the bacillus *pestis bubonicæ*. This is a short bacterium, almost as broad as long. On entering the body, either by inoculation or by way of the digestive or respiratory tracts, it multiplies with great rapidity. It is found in the blood, in the internal organs, in the intestinal canal, lymphatic glands, and in great numbers in suppurating buboes.

Outside the body it is found in dust and infected clothing and bedding of infected houses; it is also found in fleas, flies, rats, mice, cats, dogs, and other domestic animals. It is now believed that rats are the common carriers of this dread plague.

Pathology.—Rigor mortis occurs early, and often there is elevation of temperature immediately after death. Petechiæ, ecchymoses, and carbuncles are generally found upon the skin. The lymphatic system is early affected, the lymph glands of the groin and axilla being the first to show evidence of the inflammation.

Broncho-pneumonia is a common result, the lung tissues being involved more than in ordinary broncho-pneumonia. The spleen is soft and swollen, with hemorrhagic areas. The liver and kidneys also show degenerative changes.

Symptoms.—Three varieties are recognized: (1) The bubonic; (2) The pneumonic; (3) The septicemic. The first named is the most frequent and typical.

Four stages are given: (1) Invasion or prodromes; (2) Fever; (3) Localization, or development of the buboes; (4) Convalescence.

Incubation.—This period lasts from twelve hours to seven or eight days.

Invasion.—This stage begins suddenly, with dizziness, pain in the head and back, and with more or less depression; the patient is dull, eyes expressionless, and the mind is confused. When the patient attempts to walk, he staggers like a drunken man. There may be no distinct rigor, but chilliness occurs, with nausea and vomiting. Often diarrhea appears early. These symptoms last twelve, twenty-four, or thirty-six hours, when the second stage is ushered in.

Fever.—This stage frequently commences with a chill, followed by a quick rise of temperature. The pain in the head and back increases; the pulse-beat is from 120 to 140 per minute; the skin becomes hot, dry, and constricted; the temperature rises to 103°, 104°, or even 107°. The tongue is heavily coated, and sordes early show on the teeth and lips in the form of dark, bloody crusts. The vomiting may continue through this stage. The patient may become very restless, with active delirium, or the delirium may be passive, early passing into stupor. The pulse now becomes small and feeble, the face assumes a bluish hue, with coldness of the extremities, and collapse is threatened; enlargement of the glands now begins, and the third stage is present.

Development of Buboes.—The lymphatics in the groin first

appear, followed, in severe cases, by those of the axilla and other parts of the body; these develop from the third to the fifth day. If suppuration occurs, it is looked upon as a favorable symptom.

Carbuncles often occur in connection with the buboes, a favorite location being the legs, buttocks, and back of the neck. Petechiæ also may appear, which is always regarded as a grave symptom. These are known as plague spots,—responsible no doubt for the term "Black Death," the body becoming livid or black after death.

Convalescence, or Fourth Stage.—This stage begins from the sixth to the tenth day, and may be rapid, or prolonged for days, by the suppuration of the buboes.

Pneumonic Form.—In this variety the infectious agent enters by way of the lungs, while in other cases it is usually by bites or abrasions of the surface. In this form the lungs receive the full force of the poison, which is shown by the cough, bloody expectoration, pain in chest, and all the phenomena of pneumonia. These cases number the greatest fatality, and often death intervenes before the development of the buboes.

Septicemic Form.—This is regarded by Sternberg and others as rather a secondary phenomenon, occurring in fatal cases, and not a distinct form of disease.

Diagnosis.—The diagnosis would not be difficult during an epidemic; the sudden invasion, high fever, and the development of buboes are symptoms so characteristic as to leave but little room for doubt.

Prognosis.—This is the most fatal of all the infectious diseases, ranging from eighty to a hundred per cent.

Treatment.—The treatment heretofore has been very unsatisfactory, and serum therapy at present is occupying the mind of those who have to deal with the disease. If any remedy would influence the disease, we are inclined to think that it would be phytolacca and echinacea in large doses. This, however, is speculation, for we know personally nothing about it. Means to hasten the suppurative process should always be used.

Prophylaxis.—Since it is a filth disease, the attention in the future will be turned to its prevention. Vigorous action on the part of Sanitary Boards will so overcome the conditions which favor the development of the disease, that, in time, plague will become a disease of history.

LEPROSY.

Synonyms.—*Lepra*; *Elephantiasis Græcorum*; *Leontiasis*.

Definition.—A chronic infectious disease, caused by the bacillus *lepræ*, and characterized by cutaneous pigment alterations, tuberculous growths in the skin and mucous membranes, and by degenerative changes in the nerves, with implication of the lymphatic ganglia and internal viscera, and the ultimate production of a cachexia, which usually terminates fatally.

History.—Leprosy existed in Egypt 3500 B. C., and the clear-cut and well-defined description of the disease and the methods of dealing with it, as found in the thirteenth and fourteenth chapters of *Leviticus*, show that the writer was as familiar with it as the authors of modern times. *Lucretius* says, "Leprosy is a disease born in Egypt along the waters of the Nile, and nowhere else." The Hebrews brought it with them from the land of bondage, and to be a leper was worse than death.

India, Arabia, Palestine, and China have also been its home from the earliest times. During the decline of the Roman Empire, when Europe was overrun with immigration, leprosy increased to an alarming extent. *Rev. L. W. Mulhane*, in a little work on "Leprosy and the Charity of the Church," says: "In the thirteenth and fourteenth centuries, the awful disease had made such headway that leper institutions might be said to cover the face of Europe, and at one time there was scarcely a town in France but had its leper asylum, and in the kingdom of France alone there were two thousand leproseries—hospitals for lepers.

"In England one hundred and ten leper-houses existed from the twelfth to the sixteenth century."

The twentieth century finds the disease intrenched in Norway, Egypt, Syria, India, China, Japan, the West Indies, South America, the Philippines, and the Sandwich Islands. Not a single country in Europe is free from it, and in the United States there are more than five hundred cases.

The importation of leprosy into the United States may be traced to several distinct sources. *Dr. Prince Morrow* in "The Twentieth Century Practice," says:

"1. It was introduced into the Atlantic Coast cities and the countries along the Atlantic seaboard from the West Indies, and probably Africa, through the importation of slaves, and inter-

course through travel and trade with the neighboring West India Islands.

"2. By leprous immigrants from Norway and Sweden into the Scandinavian colonies of Minnesota, Wisconsin, Iowa, and Dakota.

"3. By the Acadian refugees from the British Provinces of New Brunswick into Louisiana.

"4. By lepers from Mexico into Texas and States bordering the Gulf of Mexico and the Rio Grande.

"5. By Chinese immigrants into San Francisco and elsewhere on the Pacific Coast.

"6. By Hawaiian lepers into California, Utah, and other parts of the country."

Etiology.—While all ages, conditions, and sexes are susceptible to the disease, the period between twenty and thirty years of age is the most liable to attack, and must be given as among the predisposing causes. It is somewhat more common in men than in women, and while all classes of society are susceptible, squalor and overcrowding, which give greater exposure to contagion, favor the disease. Heredity has also undoubtedly some influence.

The specific cause, the bacillus lepræ, discovered by Hansen in 1874, resembles the tubercle bacillus, though it may be distinguished from it by "differential stains," by their great number, and by their tendency to form colonies, and to the fact that as yet it has failed to propagate in inoculation tests.

Pathology.—The tubercles of leprosy are made up of granulomatous tissue, and consist principally of round cells, in and between which are found the bacilli in large numbers. These tubercular masses involve the skin, and, pushing outward, form nodular masses, between which are seen areas of ulceration and cicatrization, which, in the face, distort the features, and give rise to the so-called *facies leonina*.

These tubercular masses caseate, soften, and discharge a thick purulent material, or partial organization may take place, staying the further progress of the disease.

The destruction of tissue proceeds gradually, years being occupied in destroying the patient. The deep, ulcerative process may amputate fingers and toes in its progressive march—*lepra mutilans*. When the bacilli develop in the nerve fibers and their sheaths, a peripheral neuritis results, with local anesthesia.

Symptoms.—This is a chronic disease, lasting from five to twenty years before death finally ends what has been, for years, a living death. Indefinite prodromal symptoms, such as malaise, general depression, loss of appetite, gastro-intestinal disturbance, may appear months before the outbreak. Two distinct forms are seen: 1. The nodular, or tubercular; 2. The anesthetic.

Tubercular Form.—This is the most common form, embracing from sixty to seventy per cent of all cases. The first suspicious or positive evidence is the appearance of irregular spots or patches of erythema, more or less clearly defined and slightly hyperesthetic. These always appear on the face, though other portions of the body may be involved. After a time, these may partially or wholly disappear for a season, but always reappear, generally as circumscribed infiltrated spots. Gradually these develop into leprous nodules. The nose and lips become thickened and stiff.

These same tubercular masses appear in the nose, mouth, and throat; the voice becomes hoarse, and may finally disappear. The hair on the face, such as the eyelashes and eyebrows, drop out, the patient presenting a horrible appearance. Sometimes these infiltrated patches fail to develop into tubercular nodules, but gradually change to smooth, white patches—*lepra alba*.

The tubercular nodules, after developing gradually for years, undergo retrogressive changes, the tumors gradually melting away, leaving in their place dark, pigmented patches. In this way, bone and cartilage may be destroyed without ulceration.

Generally, however, indolent ulcers develop, which result in great destruction of tissue; the nose, fingers, toes, and sometimes an entire limb, are amputated by this method. Tubercles may develop on the cornea and iris, destroying the sight, and the patient, blind and with face horribly distorted, with nose, fingers, and toes rotting off, presents a condition unequaled in any other disease.

Anesthetic Form.—So different in character is this form of leprosy, that it is difficult to realize that it arises from the same specific cause.

The first evidence of the disease is the appearance, usually, of a local erythema, though in rare cases its first appearance is in the form of bullæ; so constant are the macules in this variety that Hansen proposed the term "macular leprosy" for that of anesthetic leprosy.

This variety is characterized by nerve lesions and trophic changes in the skin. With the appearance of the macules, which may be of a coppery hue or a pale yellow, there is a stinging, burning, or painful sensation. These appear on the shoulders, back, buttocks, knees, face, and arms, and vary in size from a dime to quite a large patch.

At first painful, it soon loses its sensibility, which is characteristic of this form. The nerve trunks affected, if superficial, can be readily felt as hard, nodular substances. Bullæ occasionally appear, leaving anesthetic patches behind; with these changes, go atrophy and contraction of the muscles.

The hands become clawed, there is wrist-drop, the face is deformed, the eyelids and mouth can not be closed, and the tears and saliva flow away; the nails split, change color, and fall off; the hair loses its gloss, and falls out; the strength gradually fails, and, after many long years, death, the leper's friend, comes to his relief.

Diagnosis.—In the early stages, the erythematous macule, with hyperesthesia, followed by anesthetic areas, is quite characteristic. In the advanced stage there would be little difficulty in recognizing either form. When there is doubt, a microscopic examination will reveal the bacillus lepra, if the disease be present, for it is known to be found in no other disease.

Prognosis.—The disease, though terminating fatally, may run for several years without very much suffering or discomfort. The profession has, as yet, looked in vain for a specific for this dread disease; hence the prognosis is almost certain death.

Treatment.—The experience of thirty-five centuries of treatment is not flattering to the profession. Of the large number of agents used, none have stood the test, and the physician of the twentieth century stands as helpless in its presence as the Egyptian healer, who practiced his art fifteen hundred years before Christ.

The medical world is anxiously awaiting the verdict of the latest remedies said to be curative; namely, chaulmoogra oil, expressed from the seeds of the *Gynocardia odorata*. Dr. Le Page, of Calcutta, was the first to use the remedy, which is given in doses of from five to eighty drops three times a day, either in capsules or in emulsion. The patients do better on the large dose; but, unfortunately, the agent is irritant to many stomachs, and

even the minimum dose can not be retained. It is also used externally in the proportion of one part to five or ten parts of olive or cocoanut oil, or as an ointment of gynocardic acid.

Gurjun oil, derived from the *Dipterocarpus turbinatus*, is also another agent of which great things are expected. This is given in emulsion, equal parts of the oil and lime-water, the dose of which is from one to four drams; externally, one part to three of olive oil or lime-water.

Since the disease, whence once contracted, is incurable, the greatest interest is attached to the problem of how to avoid getting the disease. This is of special interest to Americans in view of the recent acquisition of Hawaii, Puerto Rico, and the Philippines, each of which is the habitat of leprosy.

Isolation or segregation of lepers is perhaps the first and most important of all prophylactic means, and an "International Congress," such as met in Berlin in October, 1897, should receive the hearty co-operation of all medical men. The adoption of uniform laws among all the nations of the world, as to the establishment of lazarettos and the compulsory isolation of lepers, would go far to banishing the disease. To this should be added the improvement in the social and hygienic condition of the people.

GLANDERS.

Synonym.—Farcy.

Definition.—A specific infectious disease of the horse, communicable to man by inoculation, and characterized by the formation of nodules in the mucous membrane of the nose—glanders; and also beneath the skin and lymph structures—farcy.

Etiology.—In 1882, Loeffler and Schütz discovered the bacillus mallei, a non-motile bacillus, resembling the bacillus tuberculosis, though shorter and thicker, which, when injected into horses, reproduced the disease in its every characteristic.

The infectious material is transmitted directly from horse to man, usually through an abraded surface, and occurs most frequently among hostlers, veterinarians, farmers, and those who come in contact with horses. It has been communicated from man to man, but this is rare.

Pathology.—The granulomatous nodules are made up of lymphoid and epithelioid cells in which are found the character-

istic bacilli, and are located in the nose—glanders; or beneath the skin—farcy. These nodular masses soon discharge a yellow pus, which infects any abraded surface. In the nose, ulceration follows the suppurative process, while abscesses are found when the affection is of the skin.

Symptoms.—The disease may be divided into the acute and chronic forms, whether of the nose or that found in the sub-mucous tissues. The period of incubation is from three to five days.

Acute Glanders.—The first evidence of the disease is usually a redness and swelling at the seat of inoculation, and the neighboring lymphatics become swollen and painful. Chilly sensations, headache, nausea, and fever precede or rapidly follow the local symptoms. Within forty-eight hours, small nodules develop, which in a few days suppurate and discharge an offensive, purulent material. The inflammation extends to the adjacent respiratory apparatus, the pharynx, larynx, and bronchi often being involved; the cervical lymphatics are also implicated.

A papular eruption appears on the face and trunk and quite freely about the joints; these rapidly develop into pustules, which so closely resembles small-pox that the disease has been taken for variola. The constitutional symptoms are very pronounced, the tongue showing evidence of sepsis, and typhoid symptoms are present. After eight or ten days, the patient succumbs to the force of the disease, and death results.

Chronic Glanders.—This is a rare form, and is characterized by less intense and more vague symptoms and a more protracted course. There are ulcers in the nose, with a fetid discharge, and more or less respiratory complications. Muscular and arthritic pains are common; fever, attended by progressive prostration and general atrophy, follows, and after weeks or months of suffering the patient dies, though an occasional case recovers.

Acute Farcy.—In this form the force of the infection makes itself felt in the skin and subcutaneous tissues, while the nose remains free. The nodular enlargements are found about the joints and in the course of the lymphatics. When very large, resembling tumors, they are known as "farcy buds;" these suppurate, discharging a fetid, purulent material. There is gradual prostration, irregular fever, exhausting sweats, and colliquative diarrhea, the patient dying in from ten to fifteen days.

Chronic Farcy.—The chief feature in chronic farcy, is the formation of granulomatous tumors which degenerate into abscesses; they are chiefly found about the joints and on the lower extremities. They discharge a thick, yellow pus in the early stage, but this gradually changes to a fetid ichorous fluid; in some cases the ulceration is quite destructive, extending to the bone. This may last for months or years, the system being gradually poisoned, till at last the patient dies of pyemia or septicemia.

Diagnosis.—The history of exposure or contact with an infected animal is very important, though the severity of the nasal affection, the cutaneous eruption, the ulcers, and abscesses would hardly be mistaken for other troubles. When doubt exists, pure culture should be made and injected into a rabbit or guinea-pig; if the disease exists, the animal usually dies within twenty-four hours.

Prognosis.—In the acute forms of glanders and farcy the prognosis is unfavorable, death being almost the universal termination. In the chronic forms, some cases recover, though a large per cent end fatally.

Treatment.—Excision or cauterization of the primary lesion is recommended; though this may modify the local lesion, we are not to forget the systemic poisoning that has already occurred, and, if we hope to be successful, we must use internal antiseptics. Echinacea in full doses should be used per mouth, and after thoroughly incising and draining the abscesses, wash them with the same agent. The sulphites, chlorates, and mineral acids, as indicated, should be tried. Although the outlook is decidedly unfavorable, these agents should be thoroughly used.

ACTINOMYCOSIS.

Synonyms.—Big Jaw; Lumpy Jaw.

Definition.—A specific infectious disease of domestic animals, particularly cattle, communicable to man, and caused by the ray-fungus, the streptothrix actinomyces.

Etiology.—Dr. Bollinger was the first to observe the ray-fungus as a cause of big-jaw, in 1877. The following year, Israel found the same in man, while Ponfick, in 1879, proved their identity. The actinomyces is a fungus, consisting of delicate filaments or threads radiating from a common center; hence the

term ray-fungus. These threads present a fine, delicate network, part of which shows a tendency to branch; the ends of the filaments are bulbous or club-shaped.

Infection takes place, as a rule, through the mouth, though rarely, through the respiratory apparatus, and through a cut or abraded surface. The cereals, barley and rye, are supposed to contain the fungus, and may be a source of infection to cattle. As yet there is no evidence that man contracts the disease from the ingestion of diseased milk or meat.

Pathology.—The fungus produces a granulomatous tumor, similar to that produced by the bacillus tuberculosis, and consists of a mass of proliferated connective tissue-cells, among which are seen epithelioid and giant cells. As the growth increases in size, there is a rapid proliferation of the neighboring connective tissue, and the mass takes on the appearance of a sarcoma, and when located in the jaw may be mistaken for osteosarcoma.

While the disease is known by the name of big-jaw, we are to remember it is not limited to any organ; thus we have actinomycosis of the lungs, digestive tract, and skin. Ponfick says: "There are very few portions of the human body which may not be the seat of the actinomycotic process, and almost no organ which may not furnish lodgment for its primary focus."

Symptoms.—Actinomycosis is a chronic disease, and makes its appearance so slowly and insidiously that its early symptoms are overlooked. Again, the fact that it may attack any portion of the body gives rise to a multiplicity of symptoms; it will be well, therefore, to speak of the more prominent forms separately.

First, of the Face.—The first suspicious symptom may be pain in the jaw, or the teeth may seem affected. Again, the patient experiences pain in swallowing, and there is slight stiffness of the jaws. Following these rather vague symptoms, nodular elevations appear on the jaw or the neighboring tissues; these develop slowly, and generally without pain. Finally, after months of progressive changes, involving both hard and soft structures, the tumor mass suppurates, discharging a yellowish pus, in which is found the fungus. When the respiratory apparatus is involved, there is cough, with the development of the pulmonary abscess, and the expectoration of a fetid, disgusting mass. Progressive emaciation takes place, night-sweats occur, and the disease may be taken for phthisis or putrid bronchitis.

Where the disease invades the digestive tract, there is gastrointestinal disturbance, and when the submucous nodules, which have developed in the mucous membrane of the bowels, suppurate, the ulceration may cause perforation or peritonitis.

Where the disease involves the skin, cutaneous actinomyces, chronic suppurating ulcers discharge a non-offensive pus, yellow in color, greasy to the touch, and containing fine granules, which may be seen by the unaided eye, and which contain the fungus.

Diagnosis.—The positive diagnosis is the presence of the actinomyces in the discharged pus. The hardness of the swollen jaw and neighboring tissues, the long course of the disease, the yellow pus with visible granules, and the characteristic pyemic symptoms, all point to the disease; but the one absolute proof is revealed only by the microscope, the presence of the ray-fungus.

Prognosis.—The prognosis depends largely upon its location. When it appears externally, as upon a bone or upon the skin, and surgical aid is invoked while the disease is yet local, the prognosis will be favorable, but where internal organs, the brain, lungs, liver, intestines, etc., are involved, the prognosis is decidedly unfavorable. The disease usually terminates fatally.

Treatment.—The treatment is principally surgical, the offending parts being removed wherever it is possible. The internal treatment should be antiseptic, supportive, and constructive. Agents which improve nutrition and secretion, which improve the quality of the blood, and at the same time stimulate the excretions, will be found to give the best results.

ANTHRAX.

Synonyms.—Malignant Pustule; Splenic Fever; Wool-sorter's Disease; Carbuncle; Bloody Murrain.

Definition.—An acute infectious disease, caused by the bacillus anthracis, and characterized by the formation of a boil with a circumscribed, infiltrated base and dark center, and a systemic infection of a severe type, the toxemia being of the gravest character.

Etiology.—The bacillus anthracis, the recognized specific cause of anthrax, is the oldest known and most widely studied of all the micro-organisms. It was the first bacillus ever credited as

being the cause of an infectious disease, and was first recognized by Pollender in 1855. It is an elongated, motionless, rod-shaped bacillus, from two to ten times the length of a red-blood corpuscle; the rods are often united, giving them the appearance of "bamboo-cane."

They multiply by fission, reproducing themselves with great rapidity. They can be grown easily on various culture media. The spores possess remarkable vitality, freezing having no effect upon them, and they survive for some minutes at a temperature of 212° , the boiling point. While the bacilli are destroyed in ten seconds in a one-per-cent solution of carbolic acid, the spores will live for thirty-seven days in a five-per-cent solution of the same, and while desiccation destroys the bacilli in a few days, the spores remain active for years.

They infect cattle and sheep principally, and man occasionally, and are introduced into the system through a wound, or by the bite and sting of insects, through digestion, and also by inhalation.

Occupation is a predisposing cause, and workers who come in direct contact with infected animals or their products are most liable to the disease; as butchers, tanners, herders, hostlers, and those who handle hair and hides. It prevails in Europe, Asia, and South America, but only to a slight extent in this country.

Pathology.—The usual lesions that are found in severe infectious diseases—viz., degeneration of the liver, spleen, and kidneys—are found in anthrax. In addition to the local lesions, ulceration, and edematous infiltration, the most marked and most constant lesion is splenic enlargement, it sometimes being three or four times its natural size. The blood is dark, thick, diffuent, and rich in spores.

Symptoms.—Two principal forms occur, external and internal.

External.—Malignant Pustule.—After an incubating period of from one to four days, the patient experiences a smarting, pricking, burning, or stinging sensation at the seat of inoculation, usually the hands, face, or neck, and soon a papule appears, which rapidly changes to a vesicle, the contents of which are bloody. On rupturing, a brown or black scab forms—anthrax.

Encircling the primary pustule, are seen a number of smaller pustules giving it the appearance of a carbuncle. The base of

the primary ulcer becomes infiltrated and swollen, often involving quite an extensive area. The neighboring lymphatics soon become involved, and lymphangitis is quite common.

For the first twenty-four or forty-eight hours, the disease is of a local character, but soon systemic symptoms appear, the temperature rising rapidly; there is nausea, vomiting, diarrhea, profuse sweating, and finally collapse, which may terminate fatally in from five to ten days. In more favorable cases, the temperature begins to decline by the fifth or sixth day; the scab sloughs off, the ulcer healing by granulation.

Anthrax Edema.—In this form there is an absence of the local pustule or eschar. The infectious poison invades the deeper tissues, and is followed by swelling and edema, which in some cases is extreme. The usual seat of the edema are the eyelids, lips, tongue, and upper extremities.

Internal Anthrax.—Intestinal Mycosis.—This form is the result of eating diseased meat, or drinking milk from infected animals, and resembles ptomain poisoning from other sources. It may begin with a chill, nausea, vomiting, and diarrhea following quickly.

There is pain in the head and back, and great restlessness, sometimes accompanied by delirium and convulsions. There is dyspnea, and sometimes the patient becomes cyanotic. Hemorrhage is likely to occur from the stomach, bowels, and mucous surfaces. In some cases, small phlegmonous, carbuncular inflammation, or petechia, appears upon the skin. The fever is moderate in character. When it terminates in death, a frequent occurrence, it is usually preceded by heart-failure and collapse.

Wool-sorter's Disease.—This form occurs among workers in factories where wool and hair are assorted, especially the product from Russia and South America, where the disease prevails to such an alarming extent. The separation of the wool, and hair creates more or less dust, and this, either swallowed or inhaled, produces the disease.

There are but few premonitory symptoms, the patient being seized with a chill, attended by great prostration, the pulse being small, quick, and feeble. The temperature reaches 102° or 103°.

The general symptoms may be those of a respiratory or gastrointestinal infection, or both. The breathing is hurried, there is a sense of constriction of the chest, with cough and symptoms of

a bronchitis or pneumonia follow. Vomiting and diarrhea may accompany the above, while the cerebral symptoms may be scarcely perceptible, or of the most intense character.

The disease usually terminates fatally in from three to five days. Ball states that if the patient survive a week he will recover.

Rag-picker's Disease.—Eppinger has identified this as anthrax, the same as wool-sorter's disease, and it is found among rag-sorters working in the large paper-mills where infected rags are found. The symptoms are similar to those just described, and need not be repeated.

Diagnosis.—The fact that the patient is a worker among animals or their products, together with the appearance of a papule, rapidly changing to a vesicle, its rupture of bloody material followed by a black scab and great edema of surrounding tissue, makes the diagnosis comparatively easy.

The internal form, however, is not so easily recognized, and if we overlook the occupation of the patient, a mistaken diagnosis is very apt to occur, the symptoms being similar to ptomain poisoning from other sources, such as canned goods, mushrooms, milk and its products, etc.

Prognosis.—The prognosis may be favorable in external anthrax, when occurring in strong, healthy individuals, and when seen early, but the internal form is very grave, and the prognosis should be guarded. If the patient lives over the first week, he will most likely recover.

Treatment.—Eclectic remedies have not been tried in this disease, and we are able to say but little as to their effect; but judging this, by other infectious diseases where there is rapid infection, we would expect good results from echinacea, baptisia, the sulphites, chlorates, and mineral acids, as they might be indicated. The system should have all of these remedies that it will bear, and the local disease washed with the same.

Extirpation, probably, has served a better purpose than the cautery, though we are to remember that the patient dies from the systemic poisoning, rather than as a result of the local lesion. Cleanliness, antiseptic measures internally and locally, quiet in bed, and good nutrition will form the most successful line of treatment.

HYDROPHOBIA.

Synonym.—Rabies.

Definition.—A specific infectious disease peculiar to animals, especially the dog, and communicated to man by inoculation, generally by a bite. It is characterized in man by melancholia; great fear of water; violent spasms of the pharynx and larynx, rendering deglutition and respiration very difficult; great prostration, a stage of paralysis, which generally terminates in death.

Etiology.—The specific cause has not yet been determined, though bacteriologists agree that it is microbic in origin, that a toxin is developed which infects the saliva and blood of the victim. This is communicated to man in about ninety per cent of all cases by the bite of a rabid dog.

The presence of saliva, however, on an abraded surface is sufficient to produce the disease. Of domestic animals liable to rabies, the cat, horse, and sheep are next in order, while a number of wild animals are susceptible, and when infected lose their shyness, timid animals becoming bold.

Many persons seem immune, as only about twelve to fifteen per cent of the persons bitten contract the disease. The degree of immunity, however, most likely, is the result of the part bitten. Thus Ballinger states that ninety per cent of all persons bitten in the face contract rabies, while only a small per cent are affected when bitten on covered parts of the body, the virus being wiped off by the intervening clothing.

It is quite rare in the United States, while in Russia it is quite common. The toxin seems to spend its force upon the central nervous system.

Pathology.—The pathological changes found after death are not different from those in some other diseases, hence are not characteristic. Thus we find congestion of the mucous membrane of the pharynx, larynx, trachea, and bronchi, and sometimes of the lungs.

The abdominal viscera is not affected. The blood-vessels of the cerebro-spinal system are congested, and sometimes minute hemorrhages occur. These are most marked in the medulla and upper part of the spinal cord, but may be entirely absent.

Symptoms.—The period of incubation is longer than that of any other known disease, and varies greatly in different cases,

usually a shorter time in children than in adults. The intensity of the virus and location of the wound, in all probability, determine to some extent the time of the forming stage. When the injury is large and on the face or head, the toxin does its work more quickly.

From two weeks to three months is the usual period, though it may be prolonged to one year or more. The wound frequently heals as readily from the bite of a rabid dog as from one not affected.

Prodromal symptoms are headache, loss of appetite, and a depression that is somewhat characteristic, the patient being melancholy, with the sense of impending danger. There may be a stinging sensation or itching at the seat of the bite, and the part becomes numb; sometimes the cicatrix becomes red and swollen. These symptoms last from one to three days.

The patient is restless and uneasy, and the slightest noise, a flash of light, a draft of air, or a sudden call, will produce undue excitement; or the patient sits quietly in a despondent mood, with an occasional sigh. As the disease progresses towards the spasmodic or true hydrophobic stage, respiration becomes oppressive and the voice rough, and a seizure may be expected momentarily; this stage lasts from one to three days.

The second stage is characterized by spasmodic contraction of the larynx on attempts at swallowing. The sight of water produces great fear, and often precipitates a spasm which is attended with great suffering; the dyspnea is great, and the convulsive action of the larynx and muscles of the mouth causes the patient to emit guttural sounds, which, to the excited and horror-stricken observer, seem to resemble the bark or howl of a dog. The temperature is usually slightly elevated, from 100° to 103° , though the temperature may be subnormal.

These paroxysms occur at intervals; when the seizure subsides, the mind is perfectly clear, though the patient is greatly exhausted. In extreme cases, the patient is maniacal, and must be prevented from injuring himself or attendant. This stage lasts from one to three days, and gradually passes into the third stage, known as the paralytic stage.

The paroxysms become less violent, the patient being able to swallow with some difficulty, the prostration is great, the heart's action feeble, the skin is relaxed, and the surface is covered with

a cold sweat. The mind, which has been clear during the interval of intense suffering, now becomes clouded, and the patient finally passes into coma, the spasms entirely subside, and in from ten to twenty hours the patient expires.

Although the incubating stage may be longer than that of all other diseases, the duration of the disease is, fortunately, very short, from two to four days.

Diagnosis.—After the disease is once fully developed, there is but little difficulty in making a diagnosis. The spasm of the muscles of deglutition and respiration, the intense fear of water, the excitation of the patient on the slightest irritation, are so characteristic that one could scarcely be mistaken.

In tetanus, which slightly resembles rabies, the disease develops in from five to ten days, begins with trismus, and very often is attended with episthotonos.

Pseudo-hydrophobia—lyssophobia—somewhat resemble hydrophobia, but is purely neurotic, and occurs in hysterical individuals.

A person with a vivid imagination and of a highly excitable temperament, after being bitten by a dog, develops, in a few weeks, symptoms that may be misleading. He declares that he can not swallow, grasps his throat, breathes with difficulty, and to all appearance, has the true disease. It will be noticeable, however, that the attacks are not so severe, that the first week passes without the patient growing worse, and that the temperature remains normal.

Prognosis.—The prognosis is always unfavorable.

Treatment.—*Prophylaxis.*—The surest method would be, the muzzling of *all* dogs, as has been proven in Prussia, and later in Holland. In the former country hydrophobia was quite common previous to compulsory muzzling, but since its enforcement the disease has been eradicated.

When a patient has been bitten, the wound should at once be treated, and the poison removed by suction or the use of cups, or the injured part excised. Of course the patient would need to be seen very soon after the injury took place. If this course is not followed, then the wound should be thoroughly cauterized with carbolic acid, caustic potassium, or the actual cautery, and the wound kept open for a few weeks.

When the disease is fully developed, the treatment will be for

the purpose of relieving the patient's suffering. Inhalations of chloroform and hypodermic injections of morphia are the most efficient means for this purpose. The patient should be placed in a dark room, quiet enjoined, and all visitors forbidden. As a curative measure that needs to be tried, I would suggest large doses of echinacea, as recommended by Dr. Goss. The hypodermic injection of gelsemium is also worthy of trial.

Dr. Pasteur's preventive inoculation, that was expected to do so much for the world, has been a disappointment. Pasteur institutes were established in various parts of the world, and the zeal with which the method was used may account for the increased number of cases of rabies over former years.

TETANUS.

Synonyms.—Lockjaw, Trismus; Opisthotonos.

Definition.—An acute infectious disease, recognized as caused by the bacillus tetanus, and characterized by painful spasmodic contraction of the voluntary muscles, most frequently those of the jaw, face, and neck; less frequently those of the trunk, the extensors of the spine and limbs. It has occurred as an epidemic during times of war. In the new-born it is known as Trismus Neonatorum.

Etiology.—The tetanus bacillus was first discovered by Nicolaier, though Roenbach first found it in man, and Kitasato made the first cultures. This bacillus gains entrance into the system through a wound of some character, the most favorable being a puncture or bruise.

The bacillus tetanus is a long, slender rod, terminating in a bulbar enlargement, the spore, and giving it the appearance of a pin or drumstick. As but few of the bacilli are found in the wound, and few or none in the blood, it is now generally believed that the infection is due to a chemical product, tetanin or tetanotoxin, isolated by Brieger. Tetanus then is purely toxic in character.

The spores are found in earth and manure, in stables or streets, near polluted streams, and also in the dust from hay or the cobwebs found so abundantly in ill-kept stables. The spores retain their activity and infectious character for years; thus

Babes found the spores remain very virulent after being dried on wood, for two and a half years, without any especial protection.

Pathology.—The post-mortem lesions are neither positive nor constant. The nerves are sometimes found red, swollen, and inflamed, and in some cases granular degeneration of the nerve-cells takes place. The anterior horns of the spinal cord are usually injected, and sometimes softened.

Method of Invasion.—The infection usually enters by way of a wound, especially of the hands or feet, and a punctured wound rather than an incised one. A crushing injury, a fracture or dislocation, and in one case that came under my observation, from the cutting of a wisdom tooth.

Age, race, and climate may be mentioned as predisposing to lockjaw, from ten to twenty years being the most susceptible age, excepting tetanus neonatorum, which generally occurs during the first week of life.

The colored races are far more subject to the disease than the white, and it prevails more frequently in warm than in cold climates. The proportion of males who suffer compared to females is six to one, due no doubt to the greater frequency of injury in the male.

Symptoms.—The period of incubation is from seven to fourteen days, often less than ten. Of seventy-five cases reported by Faber, seventy-four per cent had a forming stage of from seven to eleven days.

The first symptom is a sensation of stiffness and soreness of the jaws and neck; this may rarely be preceded by chills or rigors. The soreness increases, mastication being painful and difficult; these increase, terminating in a spasm of the masseters, giving rise to trismus or lockjaw. There is also spasm of the muscles of the neck. The eyebrows are elevated, the corners of the mouth are everted, which gives rise to the condition known as sardonic grin—*risus sardonicus*. Gradually the convulsive action continues till nearly all the muscles of the body are involved save the hands and wrists.

The contractions, while continuous, are relieved at intervals by slight relaxation, only to be followed by contractions of increased intensity. During a paroxysm the head is drawn back, the powerful contraction of the muscles of the back produce a bending of the body, so that the weight of the person rests upon

the head and heels—opisthotonos. In rare cases the body is arched forward—emprosthotonos; or it may be curved laterally—pleurothotonos. During an excessive spasm there may be a rupture of the muscles.

Any slight exertion will bring on a spasm, and, later, even a sudden noise will bring on a convulsion. During a severe paroxysm the chest is contracted, the diaphragm is restricted, and the respiration is greatly impaired. The spasms are attended with acute lancinating or excruciating pains, and though the patient's mind remains clear and he is conscious of his intense suffering, the vicelike contractions render him unable to cry out.

A copious perspiration bathes the body; inability to eat or drink, coupled with the severe attacks, produces extreme exhaustion. The spasmodic contraction of the sphincters causes constipation and retention of the urine. The temperature may remain normal throughout, or, owing to disturbance of the heat centers, it may rise to 103° , 104° , 105° , or as high as 108° or 110° .

Chronic Tetanus.—In this form, there is a longer period embraced in the forming stage. The same symptoms observed in the acute will in time be enacted in the chronic, with the exception that a paroxysm is followed by an interval of varying duration when there is relaxation of the muscles and freedom from pain, save a soreness of the muscles. During this interval the patient is enabled to take nourishment and stimulants, thus preventing the exhaustion seen in the acute attacks.

Where recovery takes place, which occurs far more frequently than in the acute form, the spasms occur at longer intervals and in lighter form, till they cease entirely. Relapses may occur, however, when least expected, and the case terminate fatally.

Diagnosis.—The history, showing injury in most cases, the period of incubation lasting four or more days, the locked jaws and stiffness of the neck, the muscular contractions spreading downwards, the hands and arms escaping, the continued rigidity during the intervals of the spasms, are symptoms so pronounced that the diagnosis is not difficult.

Strychnin poisoning, the disease most likely to produce confusion, is followed almost immediately upon its ingestion by muscular contraction; there is usually gastric disturbance, and during the absence of a spasm there is relaxation. The course of the

latter is also much shorter, death or recovery occurring within twenty-four or forty-eight hours.

Prognosis.—The prognosis must be guarded; in infants, and when the result is due to deeply penetrating wounds, the termination is usually death. Every day the patient survives after the fourth day makes the prognosis more favorable. In chronic cases, a more hopeful prognosis may be given.

Treatment.—*Prophylaxis.*—In all traumatic cases, the wound should be carefully examined, and all foreign material removed, and the wound cauterized. The patient should then be placed in a darkened room, and kept free from all curious visitors, noises, and everything that would tend to cause irritation. Sometimes the slightest sound is sufficient to bring on a paroxysm.

To relieve the intense pain, morphia may be used hypodermically. The remedies, however, that will be most useful will be lobelia and gelsemium, together with the vapor bath. Dr. Waterhouse, of St. Louis, Mo., reports in the *Eclectic Medical Journal*, October, 1891, a severe case, cured by gelsemium when all other remedies had failed. He gave the remedy in thirty-drop doses every hour by mouth, and thirty drops hypodermically every six hours.

Dr. W. H. Huntly, of Australia, also reports in the same journal, November, 1893, a cure where the principal remedy used was lobelia. Dr. Wolgemuth, of Springfield, Ill., also gives a very interesting account of a cure where the use of lobelia per mouth and rectum were the chief means used. These are but a few cases of many that might be cited where these remedies turned the tide in favor of the patient. I would lay stress on the use of lobelia per rectum. Often the jaws are so firmly locked as to prevent swallowing; here thirty drops of gelsemium hypodermically, and one or two drams of lobelia per rectum, will produce the desired relaxation, when agents can not be given by mouth. The vapor bath will prove a great aid to the means already mentioned.

Where there is evidence of sepsis, the treatment will be antiseptic. It may be the sulphites, the chlorates, the mineral acids, or the well-known vegetable antiseptics, echinacea and baptisia.

As the disease is attended by great prostration, nourishment will be an important feature of the treatment. When locked jaws prevent feeding by mouth, rectal feeding should be practiced.

INFECTIOUS DISEASES OF DOUBTFUL NATURE.

FEBRICULA.

Synonyms.—Ephemeral Fever; Simple Continued Fever; Synochal Fever.

Definition.—A slight transient fever of doubtful etiology, unattended by any characteristic lesions, and terminating in recovery in from twenty-four hours to seven days.

“In malarial regions, *periodic* fevers are the rule; in non-malarial regions, in the majority of years, the disease is *evanescent fever*, or, as it has been lately described, febricula. Of this we have two varieties,—one which may be strictly termed *evanescent*, passing off by the third or fourth day; the other *protracted*, and which terminates from the sixth to the ninth day.”

Etiology.—A number of conditions predispose and possibly cause febricula, among which may be mentioned colds, retained secretions, prolonged physical or mental effort, gastric disturbances from overeating, or from tainted foods or hurriedly eating while overheated, from exposure to the sun or excessive heat, and to inhalation of sewer-gas or other noxious odors.

Anders speaks of “undeveloped or abortive forms of the *infectious diseases* (typhoid, influenza, rheumatism).” Evanescent fevers frequently occur during epidemics of the above-mentioned diseases, and may be due to a modified infection.

Symptoms.—The disease begins abruptly. “Commencing in the morning with a slight chill, the temperature rapidly ascends to 103°, but instead of falling through the night, as in other cases, it is 104° the next morning. Then there is a gradual decline through the day to 100°, a slight increase through the night and entire subsidence of febrile symptoms on the third day.

“Any one that has suffered from this evanescent fever will see that Fig. 15 is a correct index of his sensations. Commencing in seeming perfect health, there is a chill, with febrile symptoms increasing through the day; then follows a restless night, the person suffering from headache, pain in the loins, and a burning fever,—the broken sleep being attended with unpleasant

dreams; the feeling of exhaustion in the morning; the gradual improvement during the day; the second uncomfortable night, but not near so bad as the first; breakfast on the third morning, followed by a pleasant feeling of relief and rapid convalescence."

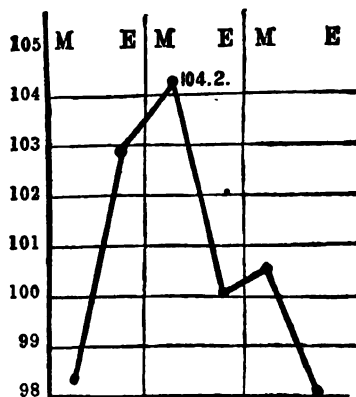


FIG. 15. RANGE OF TEMPERATURE IN A CASE OF FEBRICULA. (Scudder.)

Sometimes the fever takes a slightly different course as seen in the second diagram. The elevation of temperature the first

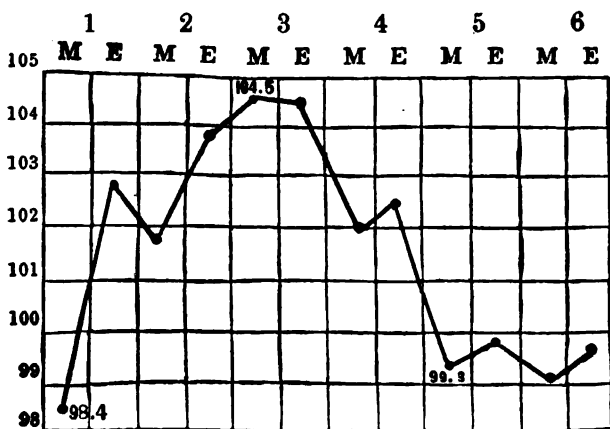


FIG. 16. RANGE OF TEMPERATURE IN A CASE OF PROTRACTED FEBRICULA. (Scudder.)

day is about the same, but the patient passes a better night, and the morning temperature is below 102°; there is then a continued increase during the next day to 104°, and a bad night carries it

up to $104\frac{1}{2}^{\circ}$ the next morning. During the third day the patient is very sick, and suffers more than in the grave forms of fever, the temperature continuing uniform. Then we notice a marked decline on the fourth day, and the low range of temperature from that until the entire subsidence of the disease.

"Synochal and Synochoid Types.—Sometimes, owing to a more intense character of the exciting cause or to greater depression of the system, the fever assumes a still more grave form, and is known as synochal or synochoid, according to the length and gravity of the fever.

"In synochal fever there are but few premonitory symptoms, the onset being more or less sudden. The patient's attention is often first arrested by chilly sensations passing over the body, and a sense of dullness and languor. Sometimes the chill is well marked, in rare cases amounting to a *rigor*, but often the sensation of cold is but slight.

"This chilliness is rapidly followed by reaction; the skin becomes injected, dry, hot, and burning; the countenance flushed and animated; the pulse frequent, full, strong, and bounding, rarely hard and oppressed; respiration is frequent, the respired air hot, and the mouth and nostrils dry; the bowels are constipated, and the urine scanty and high-colored; the tongue white, its papillæ elongated and erect. The patient experiences great thirst, and manifests increased sensibility, especially in regard to light and noise. There is frequently some headache, with sometimes vertigo, and the patient is watchful, restless, and uneasy. In children it may commence with a convulsion.

"As the disease progresses, these symptoms increase in severity; the secretions are still further arrested, the heat and dryness of the skin increase, and the patient is more watchful and uneasy. All the symptoms are usually more exasperated in the evening and early part of the night. The fever continues to increase in intensity until about the fifth or sixth day, when there is a tendency to a crisis, and the disease is frequently arrested by the establishment of secretion. If it progress much beyond this period, we observe a manifest prostration, the symptoms being those of synochoid; and in the course of as many days more, marked evidence of disorganization of the blood and typhoid symptoms. We rarely, if ever, see the disease terminate fatally as a synochal fever, unless complicated with inflammation of some important organ.

The temperature in synochal fever has a pretty high range. Yet the wave-lines or difference between morning and evening temperature are well marked. The following table gives the variations of temperature in a fever terminating the fifteenth day:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Evening		103.5	105	105.5	106	104	106.5	105	104.5	104	104.5	103.5	103	101	
Morning	99	102	102	103	103.5	101.5	104	102	102	102	101.5	100	100	99	98

"In a case developing *typhoid* symptoms in the third week, from improper treatment, we find the following range of temperature from the thirteenth day until death:"

	13	14	15	16	17	18	19	20	21
Evening	105	105.5	100	105.5	107	106.4	105	106	108.5
Morning		104	104.3	105	106	105	104.5	105	106.5

The synochoid type is of longer duration and shows greater depravity of the blood; in fact, very closely resembles typhoid fever.

"The stage of incubation is generally of some days' duration, though when the cause is intense, it may be brief. The patient complains of languor, indisposition to exertion, loss of appetite, irregularity of bowels, dryness of skin, and more or less pain in head or back, and soreness of muscular tissue. These symptoms increasing, at last a tolerably well-marked chill comes on; the patient feels cold, especially at the extremities, and chilly sensations pass over the body. These are shortly alternated with flushes of heat, which become more and more marked, until febrile reaction is established.

"In rare cases, the cold stage is as well marked as in an intermittent, amounting to a rigor; in many, the patient hardly notices the cold stage, it is so slight.

"With the development of reaction, the skin becomes hot and dry, the urinary secretion scanty, high-colored, and does not deposit a sediment, and the bowels are constipated. The mouth is dry and the tongue coated with a slightly yellowish white coat, or, in some cases, a heavy yellowish coat on base, with a bad taste in the mouth and slight nausea; in others, the gastric mucous membrane being irritable, it is elongated, the tip and edges reddened, but coated white in the center; there is thirst, but not so intense

as in the preceding form of fever. The pulse is frequent, full, sometimes hard, especially if there is irritation of the mucous membranes, or cerebro-spinal centers, but rarely bounding. In some cases there is nausea and even vomiting; but if so, the tongue will either be found heavily coated at base, with a disagreeable taste in the mouth, and sense of oppression in the epigastrium, or pointed, with reddened tip and edges, and tenderness on pressure over the stomach.

"The condition of the nervous system is variable; sometimes the patient is restless, uneasy, and watchful, the special senses being painfully acute, so that the patient can not bear a bright light, and is disturbed by the slightest noise; at others, he lies torpid, does not appear to appreciate his condition, is but slightly affected with what transpires around him, and lays quiet in one position. In either case there may be headache; in the first it is acute, the face being flushed and eyes reddened, evidencing determination of blood; in the last it is generally dull, a disagreeable sensation of heaviness and oppression.

"The symptoms above named increase in intensity to the third or fourth day, after which the fever exhibits but little change, if uncomplicated, except the increasing debility, until after the seventh day; when, if it does not terminate by the establishment of secretion, either naturally or by the aid of medicine, we observe symptoms of deterioration of the blood and prostration making their appearance, and after a variable length of time a low typhoid condition ensues, and we have, in fact, to treat a fever of the next variety, less the disease of Peyer's glands.

"*Temperature.*—The range of temperature in this form of fever is not very different from that represented in the diagrams of typhoid fever. In the milder cases, the evening range is from 102.5° to 104° ; the morning range from 100.5° to 102.5° . In the severer cases we find, during the first week, the high range of evening temperature, and long wave-line of synochal fever; and as it advances in the third week, the diminished *wave-line*, or high morning as well as evening temperature.

"We may thus readily determine the progress of the disease and the prospect of its speedy arrest. A low range of temperature, with long wave-lines, gives a favorable prognosis. Even though the fever is severe, the evening range of temperature being high, if there is the large wave-line (low morning tempera-

ture), our remedies will act kindly. It is in these cases in which we have a high morning temperature and, of course, short wave-line, that we fear difficulty."

Complications.—Febricula is often associated with sore throat, tonsillitis, irritation of the larynx, bronchial catarrh, and gastrointestinal disease.

Synochal fever is apt to be associated with inflammatory diseases of the respiratory apparatus, determination and congestion of the brain, and gastric irritability.

Synochoid fever is frequently complicated with local diseases, most generally of an inflammatory character; yet, as the fever is fully developed before the local disease commences, the symptoms of the latter are often very obscure.

"With Predominant Affection of the Cerebro-Spinal Centers.—This forms the *nervous fever* of older writers, and is not an uncommon disease. The symptoms are all increased in intensity; the skin is intensely hot and pungent, especially of the head and face; the pulse is rapid, strong, and full; the breathing frequent and suspirous, and the eyes injected and suffused. There is great irritability and restlessness, with more or less intense headache, giddiness, intolerance to light and noise, and greatly increased general sensibility. Within three or four days, delirium makes its appearance, followed in a longer or shorter time by coma-vigil, coma and insensibility, and by subsultus tendinum.

"In some cases, the cerebral affection being intense, we find stupor making its appearance speedily, accompanied by a slow, oppressed, and intermittent pulse. If the affection of the nervous centers is acute, the disease may terminate fatally without much disorganization of the blood; but if not, the fever rapidly assumes a typhoid character.

"With Predominant Affection of the Respiratory Apparatus.—This is the most common complication of continued fever, though, generally, it exists in but a slight degree. The bronchial mucous membrane is frequently irritated, with slight implication of the lungs. This necessarily aggravates the fever, and induces farther complication by preventing proper oxygenation of the blood. The patient complains of slight oppression and difficulty of breathing, with accelerated respiration and slight cough. If bronchitis is fully developed, the difficulty of breathing is increased, and secretion is generally established early, and a mucous

rhoncus is heard over the chest, upon auscultation. If much of the structure of the lung becomes diseased, the breathing is hurried, oppressed, and sometimes laborious, the sputa rounded and streaked with blood, and in a short time exhibits the characteristic rusty color of pneumonia. There are manifest symptoms of imperfect aeration of the blood, dark dusky hue of the lips and tongue, flushed appearance of face, oppressed circulation, and coldness of the extremities. With such complications, we notice that prostration is very rapid, and contamination of the fluids speedily ensues, with typhoid symptoms. Low delirium and coma are frequent attendants upon this condition.

"With Predominant Affection of the Gastro-Enteric Mucous Membranes.—In some cases we observe, at the commencement, marked symptoms of disorder of the stomach; the tongue is heavily coated, especially at its base, with a dirty-yellowish secretion; there is slight nausea; disgust for food, and oppression in the epigastrium; everything that is administered is taken by the patient with difficulty, and frequently ejected. This condition is not generally accompanied with as high febrile reaction as in the uncomplicated fever; but there is rapid prostration, and manifestation of typhoid symptoms. In this case there is increased secretion of mucous from the mucous membrane of the stomach, which, if allowed to remain, will undergo decomposition, and, being slowly absorbed, will generate decomposition of the blood. In other cases there is marked irritation of the stomach, manifested by redness of the tip and edges of the tongue, uneasiness in, and pain on pressure over, the epigastrium, with nausea and rejection of fluids and solids taken into the stomach. In this case, all the febrile symptoms are increased.

"The enteric affection does not generally manifest itself in the early stage of the disease. It commences with looseness of the bowels, two, three, or four evacuations in the twenty-four hours, with pain and soreness in the abdomen, especially on pressure. The tongue is moist and loaded with a dirty-white or grayish fur, which, as the fever advances, changes to brown, and sordes appear on the teeth and lips; in some cases, the edges and tip of the tongue are reddened. In this case, the fever rapidly assumes a typhoid character."

Diagnosis.—The diagnosis of febricula is not difficult if we remember its chief characteristics; namely, the sudden onset,

high temperature, 104° or 105° within twenty-four hours, and great restlessness and undue complaint, notwithstanding the tongue is comparatively clean and moist, and the absence of hardness of pulse, although very rapid, and the early decline of all of the above seemingly grave symptoms, renders the case quite plain.

In synochal fever, the continued reaction determines the type of the fever; the great excitation of the nervous system, with but little prostration, and the full, bounding pulse, distinguishes it from synochoid or typhoid.

In synochoid, the history of a slow forming stage, the uniform temperature after the fourth or fifth day, and the tendency to septic conditions, determine the type of the fever. Where complications have arisen, the symptoms are usually sufficiently pronounced to determine the local lesion.

Prognosis.—The prognosis is favorable in all cases of febricula, and in the graver forms of synochoid, with careful treatment, the mortality will be very small.

Treatment.—The treatment for febricula is quite simple. To a half glass of water add five drops of aconite, if the pulse be *small*; or twenty drops of veratrum and ten drops of gelsemium, if the pulse be full and bounding; of this give a teaspoonful every hour. A seidlitz powder for the bowels, and cooling lotions for the head, will be about all the medicine required.

In the synochal form, *sthenia* is the most characteristic feature, and our medication will be directed to overcoming the force and frequency of the circulation, relieving the irritability of the nervous system, and establishing secretion from the skin, kidneys, and bowels.

The *full, bounding pulse* speaks of excessive heart power, while the *flushed face*, bright eyes, and contracted pupils tell of nervous irritability. Here,—

℞ Veratrum.....gtt. xx to lx.
Gelsemium.....gtt. xv to xxx.
Water℥iv. M.

Sig. A teaspoonful every one or two hours till the pulse loses its force and frequency, and the irritability of the nervous system is overcome.

Generally, as these remedies accomplish the purpose for which they are given, the secretions become established; if, however,

this desired end is not accomplished, we commence the administration of remedies for the kidneys and bowels, continuing the sedative, however, as before. A dose of antibilious physic, followed by a diaphoretic powder, accomplishes the desired end. Should complications arise, we treat them according to the symptoms present.

The synochoid form is more of an asthenic type, and requires somewhat different medication. The patient is more passive, the temperature not so high, and the tendency is to typhoid symptoms with sepsis of the blood.

The treatment is along the same line as that of typhoid, and does not need a repetition at this time, other than to say we must keep the stomach in good condition, control the circulation, correct the wrongs of innervation, and overcome sepsis. The diet and nursing will be the same as for typhoid. (See treatment for typhoid.)

DYSENTERY. (SEE DISEASES OF THE INTESTINES.)

MILK SICKNESS.

Definition.—An infectious disease occurring in man and animals, in the latter known as “trembles.”

The disease is more frequently met with in Western States, where it sometimes occurs with fatal effect.

The **pathology** of this disease has not been carefully studied.

Etiology.—It is presumed to be due to some poison derived from the earth. The disease attacks cattle, horses, and sheep, and occasionally undomesticated animals. Where this so-called “trembles” is met with in cattle, men suffer from milk-sickness.

The poison may be communicated through milk, cheese, or butter.

It occurs in the summer and fall and more usually in adults.

Symptoms.—The prodromal symptoms are anorexia, headache, and fatigue.

Fever is present in a slight degree, accompanied by severe thirst and constipation.

Convulsions may arise and typhoid symptoms may later develop.

The *Diagnosis* is made generally through the coincident prevalence of "trembles" in the cattle.

The *Prognosis* is generally favorable.

Treatment.—The treatment is almost entirely prophylactic. The symptoms may call for echinacea or baptisia or other indicated remedy.

RARE INFECTIOUS DISEASES.

Under this heading we might include a description of *Mountain Fever*, *Weil's Disease*, *Schlammfieber*, *Malta Fever*, and *Miliary Fever*, but these are rarely met with and their pathology and treatment have not been extensively studied.

PART II.

DISEASES OF THE RESPIRATORY SYSTEM.

I. DISEASES OF THE NOSE.

ACUTE RHINITIS.

Synonyms.—Acute Nasal Catarrh; Acute Coryza; Cold in the Head.

Definition.—An acute catarrhal inflammation of the Schneiderian membrane, resulting in more or less obstruction of the nasal passages, and attended by a serous or sero-mucous secretion.

Etiology.—Among the predisposing causes may be mentioned age, the disease being more common in early life, especially in children, while the aged are comparatively immune. Hypertrophy of the mucous membrane, with narrowing of the passages, polypi, and adenoids, favor the disease.

The most common exciting cause is exposure to draughts of air and sudden atmospheric changes, so common during the early winter and spring months. The chilling of the body by wet feet during inclement weather is a very common cause. It may arise from the inhalation of irritant vapors, dust, or pollen.

At times it appears in epidemic form, which would suggest a specific germ. It also occurs as a symptom of several diseases, such as measles, scarlet fever, and the febriculas.

Pathology.—During the early stage, the mucous membrane is dry, red, and swollen, which causes obstruction of the nasal passages and renders the breathing difficult; this condition is soon followed by a profuse serous or sero-mucous secretion, which in turn may become purulent.

Symptoms.—One of the earliest symptoms is sneezing, which announces to the patient the fact that he is taking cold; this is

attended by chilliness, headache, and often slight fever, the temperature reaching 100° or 101° . The pulse is full and rapid, the face slightly flushed, the skin dry and hot, the urine scanty and high-colored, and there is constipation.

The swelling of the mucous membrane obstructs nasal breathing, and the voice becomes nasal. When the inflammation is active the mucous membrane of the lachrymal ducts becomes swollen and the tears overflow—*weeping cold*. The sense of smell early becomes impaired.

Very early in the disease there is an irritating secretion from the mucosa, at first watery in character, soon changing to mucus

FIGURE 17. ACUTE RHINITIS.—(Foltz.)

or muco-pus. In severe cases there may be an extension of the inflammatory process to the Eustachian tube, attended by ringing in the ears and more or less pain, or it may extend to the pharynx, larynx, or even the bronchi.

Many times it is entirely of a local character, the only disagreeable symptom being a stuffy feeling in the head, attended by a profuse secretion, which necessitates the almost constant use of the handkerchief. Not infrequently the irritating secretion causes labial herpes—fever blisters. An attack usually lasts from three to six days.

Diagnosis.—Frequent sneezing, with catarrhal symptoms, renders the diagnosis very easy. We are to remember, however, that these same catarrhal symptoms are among the first evidences of measles and influenza.

Prognosis.—The prognosis is always favorable, though if neglected it is apt to assume the chronic form.

Treatment.—If seen at the very beginning, the disease can usually be aborted by a single dose of fifteen or twenty drops of specific gelsemium taken at *bed-time*, or a few drops of the following:

℞ Camphor.

Turpentineaa ʒii.

Alcoholʒss. M.

Sig. Of this eight or ten drops on sugar may be taken every three or four hours.

If it be a *weeping* cold, a half grain of powdered opium, taken at bed-time, rarely ever fails to cut short the disease. When this agent is used, the patient must be instructed to keep his bed the following half day to avoid the sickness that so often follows the use of opium.

Diaphoretic pwd. gr. iij, and quinine, gr. v, taken at night, are also good to abort a cold. When these means fail to abort the disease, the treatment will vary according to the symptoms present.

Bryonia.—When the secretion is glairy, aconite and bryonia will give good results, while if the eyes burn or there is an acrid secretion from the nose and an overflow of the tear-ducts, rhus tox. will replace the bryonia.

Local Treatment.—Alkaline nasal washes may be used with benefit in the early stages; a weak solution of boracic acid, sodium bicarbonate, or common salt being among the best. Later and when the secretion is thick, a few drops of camphor menthol and alboline solution, placed on cotton and introduced into the nostril, and allowed to remain for five or ten minutes, will give good results.

CHRONIC RHINITIS:

Synonyms.—Chronic Nasal Catarrh; Rhinitis Hypertrophica; Rhinitis Atrophica; Ozena.

Definition.—A chronic inflammation of the nasal mucous membrane, often involving the nose and pharynx, and characterized by hypertrophy of the membrane and turbinated bones,

an offensive secretion, and an impairment or loss of the sense of smell.

Etiology.—The most common cause is recurring attacks of the acute form, though syphilis and tuberculosis come in for a large share in giving rise to the disease. The inhalation of irritants, mentioned as a cause in the acute form, may also be responsible for the chronic variety. The disease is most common in children, and not infrequently is due to adenoids in the naso-pharynx.

Pathology.—The pathological changes noted in chronic nasal catarrh depend upon the form or stage of the disease, there being three varieties:

1. In simple chronic catarrh there is irritability of the mucous membrane, which becomes congested and swollen, causing more or less obstruction to the free passage of air. There is a profuse secretion of a thick, tenacious mucus. In time the inferior turbinate becomes hypertrophied, and the disease passes from the simple form to the hypertrophic.

2. In the hypertrophic variety, which usually follows the above mentioned form, there is thickening of the mucous membrane and enlargement of the inferior turbinated bodies, so that the passage is nearly or quite obstructed, the patient breathing through the mouth. Often adenoids develop in the naso-pharynx, which necessitates mouth-breathing altogether. There may be swelling of the Eustachian tubes, which renders the patient dull of hearing. As in the simple form, there may be profuse secretion of thick, viscid mucus.

3. In atrophic rhinitis there is thinning of the mucous membrane, with consequent widening of the air-passage. The membrane is pale, relaxed, and secretes an offensive, purulent material, which, drying, forms crusts or scabs, and, when removed, leaves an excoriated surface. In this form the sense of smell is destroyed.

Symptoms.—The most common and prominent symptom is the obstructed nasal breathing, due to hypertrophy of the membrane and turbinated bodies. The patient sleeps with the mouth open, the breathing being sonorous. The secretion drops into the naso-pharynx, and is removed by frequent hawking.

An examination of the nose reveals its true character. In the atrophic form, the fetid odor is the most characteristic symptom.

Nasal breathing may be somewhat difficult owing to dried crusts; but when these are removed, the nasal passages are found abnormally roomy. The sense of smell is destroyed.

Inspection shows the mucous membrane thin and covered with grayish or yellowish crusts, the removal of which leaves an excoriated surface, though seldom an ulcer. Severe headache is quite common in this form.

Treatment.—Where there is much hypertrophy of the mucous membrane, and especially of the turbinated bodies, the patient should be referred to a specialist, as operative measures promise more speedy relief. In the early stages, and when the hypertrophy is not marked, the general practitioner may treat the case quite successfully.

The treatment will be both local and general. Where the patient is able to travel, mild, equable, and dry climates should be advised.

Cleanliness is of great importance in this disease. To attempt to medicate a case of chronic rhinitis without thoroughly cleansing the passages is to court defeat. This may be accomplished by the use of an atomizer throwing a coarse spray. Boracic acid, a three-per-cent solution of pyrozone, a normal saline solution, a Seiler's tablet dissolved in water, and glyco-thymolin, are among the best remedies for this purpose. Having thoroughly cleansed the nostrils, we should use a tonic, astringent, or antiseptic solution, according to the condition of the membrane, care being used to avoid strong solutions. Hamamelis, potassium chlorate, and similar remedies will prove useful. For ozena, a douche or spray of glyco-thymolin, well diluted, will give good results.

Nearly all cases will need general treatment as well as local. There is either defective metabolism or impaired digestion, usually both, and the treatment will be to break down feeble tissue, stimulate the excretory organs to eliminate the detritus, and at the same time supply good, nourishing material, properly prepared, to build up the system.

Well-regulated outdoor exercise increases oxidation of the tissues, and also sharpens the appetite. A good tonic, like nuxvomica and hydrastis or the compound tonic mixture, will be of great benefit.

If syphilitic, echinacea, Donovan's solution, potassium iodide, and like remedies should be given. If tubercularly inclined, a change of climate, outdoor life, and iron and arsenic, the hypophosphites, etc., would be suggested.

FIGURE 18. VERTICAL ANTEROPOSTERIOR SECTION UPPER RESPIRATORY TRACT.—(*Foltz.*)

AUTUMNAL CATARRH.

Synonyms.—Hay Fever; Hay Asthma; Summer Catarrh; Rose Catarrh.

Definition.—An affection of the mucous membrane of the eyes, nose, and upper-air passages, characterized by coryza, laryngeal irritation, and asthma, and occurring during the summer months, usually August and September, and disappearing with the first heavy frost.

Etiology.—The predisposing cause is the possession of a peculiar idiosyncrasy, which is so subtle as to escape detection. It develops suddenly, occurs each year with almost mathematical precision, and, once acquired, the habit is seldom ever lost, but grows more confirmed with each year. The conditions favoring this peculiar habit are race, temperament, mode of life, age, sex, education, and heredity.

Race.—It is a little singular, but the English and the Americans are the principal sufferers from hay fever, it being extremely rare in Norway, Sweden, Denmark, France, Italy, Spain, and Russia, and when found is generally confined to the English resident. Dr. Jacobi, of New York, a few years ago, stated that he never had met with a case in a German. The French people seem singularly exempt, though the nervous temperament largely predominates in that race.

Temperament.—While all persons suffering from hay fever are not necessarily extremely nervous or excitable, yet it is largely a nervous lesion, and is found most frequently in persons of an active, energetic, and nervous temperament.

Education.—Another peculiar feature of this disease is, that it is almost entirely confined to the educated or cultured class and those who enjoy social position. McKenzie states that he never met a case in hospital practice, while Blakely reports forty-eight cases, every one of which belonged to the educated class, and Wyman reports forty-nine out of fifty-five cases as belonging to the cultured class.

Mode of Life.—Although pollen is supposed to be the most common cause, it is a recognized fact that the class of people who are most exposed to this exciting cause seldom ever have the disease; namely, those residing in the country, and agricultural laborers. Beard found only seven cases, out of two hundred

recorded, in persons *living* in the country. No doubt the quiet of the country allays the nervous irritability that is so often incited by city life.

Heredity.—Heredity undoubtedly plays some part in favoring the disease, since a history of the disease in some of the relatives can be found in from twenty to thirty per cent of all cases of hay fever.

Age.—It seldom occurs in the extremes of life, though McKenzie reports that he met with a case in a child two years of age, and cases have been recorded when it first occurred after the age of sixty. From puberty to the age of thirty is the most prevailing period.

Sex.—Males are more frequent sufferers than females, owing, no doubt, to greater exposure to the exciting cause.

Exciting Cause.—The most common cause is the pollen of various plants, though dust may act as the irritant, and sometimes emotional excitement is sufficient to bring on an attack in one possessing the peculiar idiosyncrasy.

Symptoms.—The disease comes on more or less suddenly with a sense of tightness or constriction of the head, a burning or itching sensation in the eyes, especially in the inner canthus, and also in the nose and throat. Soon violent sneezing occurs, accompanied by a profuse watery discharge from the nose and eyes.

The eyes, nose, and cheeks become swollen, and the patient has the appearance of having a long crying spell. The mucous membrane of the nose becomes hyperemic and swollen, which obstructs nasal breathing. Often the irritation extends to the larynx and bronchi, giving rise to hay asthma.

An attack may be confined to the nose and eyes, coryza being the troublesome symptoms; but in the most severe cases the throat and bronchi become involved, the asthma and coryza going together. The patient breathes with difficulty, paroxysms of coughing occur at intervals, and the patient presents a depressed and worn appearance. These attacks, varying from the mild to exacerbations of the most intense character, according to exertion, weather, and the presence of irritating pollen, dust, etc., last from four to six weeks, or till frosts cut short the disease.

Diagnosis.—The disease is easily recognized by the sudden onset of sneezing and severe coryza—these symptoms occurring in a person of a neurotic temperament—and the almost mathematical

precision of its return, August and September, and its defiance to medication, leaves no doubt as to its identity.

Prognosis.—The prognosis is favorable as to life, but unfavorable as to cure, unless the patient removes to some climate where the exciting cause possesses no power to influence the sensitive nervous system.

Treatment.—Where the patient is financially able to profit by such advice, he should be advised to visit the lake resorts of Michigan—Petosky, Mackinac, and the Soo being a few of the many places of this character where he may get relief; also the Adirondacks, the White Mountains, or a sea voyage. He should go a few days before the fever's annual return or as soon as it occurs, and remain till after frost.

Sterilizing the nasal chambers with Dobell's solution, as recommended by Hollopeter, and followed by plugging the nose with cotton saturated with a mild solution of menthol in alboline, affords great relief. Internally, specific belladonna, ten drops to a half a glass of water, a teaspoonful every one, two, or three hours, has given good results. *Sticta pulmonaria* is also a good agent where the coryza is marked, accompanied by asthma and a dry, hard cough. Specific *aralia* is another remedy that should not be overlooked.

EPISTAXIS.

Synonym.—Nosebleed.

Definition.—Hemorrhage from the nose, arising in the cavity or in sinuses leading into it.

Etiology.—Bleeding from the nose is quite a common occurrence, especially in early life and may be due to local or constitutional conditions. The most common local cause is injury to the vessels, which in the nose are very superficial; thus a fall, a blow, or picking the nose—a very common habit in children—or even sneezing, often results in obstinate bleeding. The introduction of foreign bodies, quite common in children, may be the exciting cause. Nasal polypi and malignant growths may also be responsible for the trouble.

The constitutional cause may be due to a change in the blood itself, or it may be due to a diseased condition of the blood-vessels, or it may arise from obstruction to the pulmonary circulation,

and it may possibly, at times, be vicarious. Hemophilia or the hemorrhagic diathesis often gives rise to the most severe and persistent types. Typhoid fever is often accompanied or preceded by nosebleed.

Symptoms.—In plethoric individuals there may be a sense of fullness in the head, flushing of the face, and throbbing of the carotids, as prodromes. The bleeding varies in quantity and character; thus it may slowly drip, drop by drop, for hours, or it may flow almost in a stream, passing downwards into the pharynx; the patient may swallow large quantities, to be vomited up as black coagula, which is sometimes mistaken for hematemesis.

Should the hemorrhage continue for hours, the patient becomes anxious and alarmed at his condition, the pulse becomes small and quick, and the patient shows marked depression.

Treatment.—Generally, local measures are the only ones that need to be used. Pressing the finger firmly against the affected side for several minutes is often sufficient, or firm pressure against the facial artery for several minutes may be effective.

The use of tannin and the iron preparations I do not like, as they are apt to irritate the mucous membrane, and when the hard clot is removed, the hemorrhage often breaks out afresh. The injection of very hot water is sometimes very useful.

Pledgets of cotton in chloro-septic has given me good results.

When the bleeding persists, notwithstanding these measures, the nose should be thoroughly tamponed. A pledget of common cotton (not absorbent), to which a string is firmly tied, should be pushed far enough back to get beyond the bleeding points; then more pledgets are to be crowded in till the nostril is firmly packed. The hemorrhage ceasing, the tampon may be allowed to remain ten, twelve, or twenty-four hours, though blood in the nose very soon decomposes and becomes quite offensive.

To remove the tampon, great care must be used or the hemorrhage will be renewed. The tampon should be softened with warm water, when it will readily slip from the nostril upon slight traction of the string, which has been carried to the side of the nose and fastened by an adhesive strip.

Where the hemorrhage is passive and consists of a continued oozing, the first trituration of charcoal will give good results, three to five grains every two hours. Oil of erigeron, or cinnamon, may be used successfully, and ergot hypodermically, when the hemorrhage is very stubborn.

II. DISEASES OF THE LARYNX.

ACUTE CATARRHAL LARYNGITIS.

Synonym.—Croup.

Definition.—An acute catarrhal inflammation of the larynx, characterized by a hoarse croupal cough.

Etiology.—The most common cause is cold, induced by sudden atmospheric changes so common in the early spring and late fall months. The inhalation of irritating vapors may give rise to it and certain articles of food may produce it; thus, in one of my own children, hot oyster-soup would invariably bring on an attack, usually while the child was still at the table.

The disease occurs most frequently in children between the ages of two and six years, and when appearing in the adult is of a different type than croup in children, and will necessitate a separate description.

Pathology.—Although a true inflammation of the mucous membrane, there is not such marked changes as one would expect from the severity of the clinical symptoms. There is hyperemia of the mucous membrane, which is red, tumid, and slightly swollen.

At first the membrane is dry, but soon a glairy, tenacious mucus is secreted. Edema of the larynx is seen in several types. There may be slight hemorrhage in the mucous membrane, and erosions may be seen on the vocal cords and portions of the larynx. The changes, however, are not sufficient to account for the severe dyspnea so often met with in croup, and must be accounted for by spasmodic contraction of the intrinsic muscles of the larynx. In rare cases ulceration of the larynx is noted.

Symptoms.—The symptoms vary with the age of the patient. In the child the croupal symptoms are characteristic, while in the adult they are entirely different, each needing a separate consideration.

In the Child.—*Catarrhal or Mucous Croup.*—Dr. Scudder's description of the disease being so realistic, I reproduce it here.

"Frequently, for a day or two before the attack, the child will have had symptoms of cold, with a slight cough. Both the cough

and voice are frequently a little hoarse and rough, and would be recognized by a person acquainted with the disease as croupy.

"The attack of croup occurs most frequently in the night, though it may be in the daytime. The child seems to be suffering from a cold during the evening, but is put to bed without probably a thought of danger. But along about the middle of the night the parents are aroused by the child starting out of sleep with difficult respiration, a hoarse voice, and croupal cough.

"The respiration is rough and whistling, the cry hoarse and feeble, except when a great effort is made, when it becomes shrill and piping. At first the difficulty of respiration is intermittent, but after an hour or two it becomes permanent, and there is a peculiar whistling or gurgling sound as the air passes into and out of the larynx.

"As the disease progresses the difficulty of respiration becomes more marked, and the cough is hoarser, has a peculiar metallic tone, and the voice sinks to a whisper. If the child sleeps, mucus accumulates in the throat, the breathing becomes more and more difficult, until at last the child wakes with symptoms of asphyxia.

"At first the skin is dry, the temperature is increased, and the pulse is full and hard; but as the respiration becomes more difficult, a cold, clammy perspiration breaks out, the extremities become cold, and the pulse frequent and feeble. The disease runs its course in from twelve to twenty-four hours, terminating in a subsidence of the disease or death."

Laryngitis in the Adult.—It usually commences with a slight chill, soreness, and stiffness of the throat, difficulty of swallowing, a sense of constriction and a desire to clear the throat. Following the chill, febrile action comes up, and is quite intense, considering the extent of the inflammation. Then a dull pain is felt in the throat, the sense of constriction is markedly increased, and there is tenderness on pressure; the voice is harsh, hoarse, or stridulous, and there is a frequent dry, short cough.

If the throat is now examined, the fauces will be found red and tumid, and when the tongue is pressed down, the epiglottis may be seen erect, swollen, and red. In the course of from twelve to twenty-four hours the inflammation has markedly diminished the aperture of the glottis, the voice becomes small, piping, whispering, and soon suppressed. The breathing is difficult, inspira-

tion being sibilus, shrill, prolonged, and laborious, the larynx being forcibly drawn down on each attempt to inflate the lungs.

The cough is stridulous and convulsive, and is attended by attacks of spasm of the glottis, which threaten suffocation; the expectoration is scanty and viscid, and removed with difficulty. In the last stage of the disease, the patient exerts all his power in respiration, sitting upright and grasping objects in reach to bring into play the external inspiratory muscles. The countenance is pale and anxious, the lips livid, and the eyes almost start from their sockets, the extremities are cold, and covered with a clammy perspiration. Soon a low delirium, or coma, comes on, the pulse becomes more feeble and intermittent, imminent symptoms of asphyxia appear, and the patient rapidly sinks.

Fortunately, the termination is not so serious in most cases, and, after twenty-four or forty-eight hours, the cough is attended by expectoration of mucus, with relief to the dry, sibilant respiration and a subsidence of all the grave symptoms, though the voice remains hoarse for several days.

Diagnosis.—In the child, the hoarse, metallic (croupal) cough, with hoarseness and change of voice, is sufficient evidence of croup, but it does not inform us which of the three varieties it is.

In mucous croup, there is the slight febrile action to distinguish it from the spasmodic variety, and the evident presence of mucus in the larynx manifested by the rattling sound heard on auscultation and in coughing, which distinguishes it from the pseudo-membranous form.

In the adult, the hoarse voice, sibilant respiration, cough, and sense of soreness and constriction in the larynx enables one to recognize the disease.

Prognosis.—The prognosis is nearly always favorable.

Treatment.—Aconite seems to possess a peculiar affinity for the larynx, and in acute cases it is one of our surest remedies. Add two to five drops of the specific tincture to a half a glass of water, and give a teaspoonful every ten, twenty, thirty, or sixty minutes. It quiets the irritable larynx and favorably influences the fever and inflammation. In connection with this, drop doses of stillingia liniment may be used, and also rubbed over the larynx. It is a good plan to alternate one drop of the stillingia with one teaspoonful of the aconite mixture every ten minutes.

When the respiration is dry, sibilant, and labored, wring a sponge out of hot water, and drop a few drops of stillingia liniment on it, and hold to the mouth, the patient inhaling the medicated steam. In very severe cases, however, inhalations of steam from hot water and vinegar and hops will give better results.

Lobelia.—When there is dyspnea, add fifteen or twenty drops of specific tincture of lobelia to the aconite solution. Cloths wrung out of hot water and pinned snugly around the throat, with a dry binder over the wet one, assists in producing relaxation.

Potassium bichromate is often used with benefit after the inflammation has spent its force, the voice remaining hoarse and husky. Of the second trituration, add five grains to a half a glass of water, a teaspoonful every hour.

The acetous tincture of lobelia and sanguinaria, used by the early Eclectics, is a very successful remedy, though not pleasant. It should be given often enough to produce nausea, but not carried to emesis.

℞ Acetous Emetic Tincture.....℥ss.
Simple Syrup.
Wateraa ℥ii. M.
Sig. A teaspoonful every twenty, thirty, or
sixty minutes, till relaxation is produced.

CHRONIC LARYNGITIS.

Synonym.—Ministers' Sore-throat.

Definition.—Chronic catarrhal inflammation of the larynx.

Etiology.—Repeated attacks of acute laryngitis may finally result in the chronic form, though continuous use of the voice, especially in the open air, is the most common cause. The inhalation of tobacco-dust is also a not uncommon cause, cigar-makers frequently being sufferers from this disease.

Pathology.—The mucous membrane is red or violet-colored, is thickened and sometimes presents a granular appearance. The vocal cords share in the alteration, while erosion of the mucous membrane, with occasional ulceration, is a rare condition.

Symptoms.—Chronic laryngitis usually comes on slowly and insidiously, the patient being hardly aware that he is suffering

from a serious disease until it is confirmed. The first symptom is soreness of the throat when speaking, with a sense of constriction, slight alteration of the voice, cough, and expectoration, which comes on after slight exposure, or overexertion of the larynx. These symptoms are ameliorated in a short time, and the patient thinks it is only a slight cold, from which he is recovering. As time passes, however, the attacks become more frequent, last longer, and do not so readily disappear.

When the disease is fully established, there is a constant uneasy sensation in the region of the larynx; the voice is seriously altered, and there is a constantly annoying cough, with expectoration. The expectoration is at first scanty and mucous; but as the disease advances it is muco-puriform, sanious, concreted into lumps, or consists of almost pure pus. Hemorrhage occurs in the latter stages, sometimes in very large quantities.

If the throat is examined, we notice the evidence of chronic inflammation of the fauces, pharynx, epiglottis, and we reasonably suppose that the mucous membrane of the larynx corresponds in appearance; with the laryngoscope we are enabled to view the internal surface of the larynx, and determine its condition quite accurately.

A person suffering from "ministers' sore-throat," or chronic laryngitis, is very subject to cold, and every change in the weather or slight exposure is followed by an increase of the disease. A very important part of the treatment of every case, therefore, will be directed to obviate this.

The impairment of the general health is usually in direct ratio to the severity of the local affection. At the commencement, the patient complains simply of debility, with some failure of the digestive organs, and sometimes torpor of the secretions. When it has progressed for some months, he is unable to attend to business; there is loss of flesh and strength; there is marked impairment of the digestive functions and of the excretion.

Frequently the system becomes so depressed that tubercles are deposited in the lungs, the symptoms of phthisis are developed, and the disease runs a rapid course to a fatal termination.

Diagnosis.—We diagnose chronic laryngitis by the unpleasant sensations in the region of the larynx, the cough, and by inspection of the throat, and the absence of physical signs of other diseases of the respiratory apparatus.

Prognosis.—Ministers' sore-throat can be readily cured in the majority of cases, if the person will give the vocal organs rest; usually from four to twelve months will be required. The prognosis in confirmed laryngitis is not favorable, as but few have the patience necessary to persist in the use of remedies until a cure is effected. It can be cured, but it requires time and perseverance; otherwise the disease is as fatal as confirmed phthisis.

Treatment.—The treatment will be both local and systemic. A careful examination is to be made, and if there be an elongated uvula or enlarged tonsils, these conditions must be corrected if we are to derive the best results from medication.

The chief remedies that specifically influence the larynx are specific collinsonia, stillingia, penthorum, potassium bichromate, calcium sulphide, and sanguinaria. Where the tissues are congested and dusky, collinsonia will be found a reliable agent. Add one dram to water four ounces, and give a teaspoonful every three hours.

Penthorum.—Where the tissues are dry, with violet color, penthorum will be the agent, one or two drops every three or four hours.

Potassium Bichromate.—Where the voice is hoarse, and where there is loss of voice, the second trituration of potassium bichromate in two or three grain doses will be efficient.

Sanguinaria.—Where there is a tickling sensation in the larynx, causing an almost constant, hacking cough, use sanguinaria.

Stillingia.—The hoarse, husky voice will require stillingia; the tincture may be used, but the stillingia liniment, I think, gives the better results. One drop on sugar every one, two, or three hours.

Calcium Sulphide.—Where the expectoration is of a mucopurulent character, calcium sulphide, second trituration, will be found to give good results.

When there is great irritability, causing a hard cough, with loss of sleep, a quarter of a grain of codein should be given till the irritability subsides.

It seems almost superfluous to say, the patient must rest the voice while undergoing the treatment. Local measures are very important, and consist of gargles, sprays, and packs to the throat. Where the tissues of the pharynx are involved and show the same

dusky hue as the larynx, a gargle of hamamelis will be found useful. If ulceration be present, listerine is beneficial used in the same way.

The most successful local treatment, however, is that obtained by the use of the spray. The small hand-spray atomizer may be used, though better results follow the use of the steam or compressed-air atomizer. The remedies used will be selected, with reference to the condition of the part affected, and will be sedative, stimulant, narcotic, tonic, and astringent. Where there is irritation with *dryness*, and a tenacious secretion of viscid mucus, an infusion of lobelia will be found beneficial. When there is an irritable cough, preventing rest, vinegar of opium and lobelia is a useful spray. If the tissues are lax, and a tonic is needed, hydrastis may be used, or an astringent solution of tannic acid, alum, or an infusion of red-oak bark or yellow root, as used by the early Eclectics. For ulceration, potassium or iodine may enter the mixture. The physician has a large field of remedies from which to select, and if he be careful as to the *condition* of the larynx, he can select the remedy with a great deal of confidence.

The cold pack at night, with a dry binder pinned snugly around the throat, followed by flushing the throat and chest with cold water in the morning, will do much to prevent taking cold.

A change of climate is nearly always beneficial; an ocean voyage or residence in the pine woods for a few weeks, often accomplishes wonders. Smoking and the use of alcoholic liquors are to be positively forbidden.

SPASMODIC LARYNGITIS.

Synonyms.—Spasmodic Croup; Laryngismus Stridulus; Spasm of the Larynx.

Definition.—A disease of the larynx occurring in neurotic individuals, usually in children from six months to six years old, though occasionally in the adult.

Rickets predispose to this affection, and, in those susceptible, the disease may arise as a reflex disturbance from intestinal parasites, from dentition, from irritation of the prepuce, from indigestion, or it may arise from the ordinary causes that give rise to croup, cold being the most common. In rare cases the dis-

ease, a spasmodic contraction of the adductor muscles of the larynx, is due to emotional excitement.

Pathology.—Soon after a severe attack, the mucous membrane becomes congested and swollen, which continuing the spasmodic action of the intrinsic muscles, may result in inflammation. Edema of the glottis and neighboring tissues, is not uncommon.

Symptoms.—The disease usually comes on suddenly, the child being aroused from sleep with a start, there being great difficulty in breathing. The child has a hoarse, croupal cough, the voice soon sinks to a whisper, and the breathing becomes shrill and stridulous. Spasm of the glottis occurs, the child becomes cyanotic, and for several seconds holds his breath; this is followed by relaxation of the spasm, when the child utters a shrill, piping cry. In a few minutes relief is experienced, and the child drops to sleep, the breathing being comparatively easy. After a short period the child is again awakened by another paroxysm, and a repetition of the first attack occurs: thus the disease is made up of paroxysms and remissions.

During the remissions the skin is moist and the pulse regular, showing an absence of inflammatory symptoms. These attacks follow two or three nights in succession.

At other times the child will be attacked suddenly with difficult breathing, there being no cough or hoarseness. These attacks terminate in a high-pitched crowing inspiration. They may occur during the day as well as at night. During an attack, the child's face becomes livid and anxious, and in rare cases convulsions occur. Occasionally it proves fatal, the child choking to death.

Diagnosis.—We diagnose spasmodic croup by an absence of inflammatory symptoms, the dry, sibilant respiration, the shrill, piping cry, the absence of the mucous rattle, and the spasmodic character of the attack.

Prognosis.—Although a severe attack presents a frightful picture, the disease very rarely terminates fatally.

Treatment.—The remedies for spasmodic croup will form the basis for laryngitis stridulus in the older patient. If the disease is not very severe, drop doses of stillingia liniment on sugar every ten or twenty minutes, and an application of the same rubbed over the larynx every hour, will often be the only remedy needed.

When very severe, the compound tincture of lobelia and sanguinaria (King's acetous emetic tincture) may be given every ten, twenty, or thirty minutes, till relaxation is produced. It is not necessary to produce emesis.

A flannel cloth wrung out of hot water and applied to the throat, and a dry binder covering the wet one, will assist greatly in producing relaxation. Should the child be unable to get its breath, insert the finger into the larynx and hook up the epiglottis.

In addition to the above treatment, inhalations of steam from hops, tansy, or lime-water should be used. An ordinary teapot may be used, to the spout of which may be attached a short piece of hose and conveyed to the face of the child.

Intubation or tracheotomy should be resorted to only in extreme cases, and where the patient's life is threatened.

After the attack is over, the case should be thoroughly examined to ascertain the exciting cause. When due to reflex disturbance, we may expect a return of the disease unless the exciting cause be removed; hence any wrongs of the stomach, digestion, or of the bowels, parasites, hemorrhoids, or other rectal troubles, or wrongs of the reproductive apparatus, should be corrected.

Spasmodic croup is often distinctly periodic, when quinine should be administered. For the hoarseness, that sometimes continues for several days, stillingia liniment or potassium bichromate, the second or third trituration, will usually be all that is required.

EDEMATOUS LARYNGITIS.

Synonyms.—Edema of the Larynx; Submucous Laryngitis.

Definition.—An infiltration of the mucous membrane of the larynx with serum, usually due to inflammation.

Etiology.—Edema of the larynx may arise from injuries to the mucous membrane by swallowing a hard, rough, or sharp body, as a spicula of bone, or by the application of a caustic to the larynx. It may be due to an extension of inflammation of the neck and pharynx, or, in rare cases, to acute catarrhal laryngitis. Some drugs will give rise to it, notably potassium iodide.

It may arise as a complication in certain infectious diseases,—

diphtheria, erysipelas, typhoid fever, hydrophobia, scarlet fever, influenza, etc. Tubercular, syphilitic, and malignant diseases of the larynx may be accompanied by edema.

It generally accompanies dropsy, due to kidney or cardiac lesions.

Pathology.—The mucous membrane of the upper portion of the larynx, the rim of the glottis, and the covering of the epiglottis are infiltrated with serum. The effusion into the submucous tissues of the aryteno-epiglottis folds may be so extended as to include the respiratory passage.

Symptoms.—"The disease commences with a continually increasing impediment to respiration, and a feeling of fullness and constriction and continuous desire to clear the throat, as if caused by some foreign body; the voice becomes hoarse, croupal, then sharp, stridulous, whispering, and is then lost completely; there is a hoarse, convulsive cough, with fits of suffocation, causing great agony. While inspiration is prolonged, stridulous, and exceedingly difficult, expiration is comparatively easy. This feature is so marked as to be pathognomonic of the disease.

"There is no fever, but as the disease progresses the pulse becomes frequent, small, and irregular. The difficulty of breathing increases; the fits of coughing and suffocation are more frequent; symptoms of asphyxia are very apparent; the cerebral functions are disturbed; and at last death ensues from inability to inflate the lungs."

Diagnosis.—The difficult, labored respiration and easy expiration will suggest the character of the disease, while a laryngoscopic examination removes all doubt.

Prognosis.—The prognosis is unfavorable unless relief be obtained by prompt surgical interference.

Treatment.—If due to inflammation,—

R	Aconite	gtt. 3-5.	
	Apocynum	gtt. 5-10.	
	Water	℥iv.	M.
	Sig. Teaspoonful every hour.		

Cloths wrung out of ice-water and applied to the throat, with small bits of ice held in the mouth, affords some relief. If no fever be present, cactus, convallaria, or strophanthus may be combined with the apocynum. Jaborandi and pilocarpin have been

used with benefit by producing profuse diaphoresis. Where no relief is experienced by medication or scarification, intubation should be tried, and, this failing, as a last resort tracheotomy should be performed.

PSEUDO-MEMBRANOUS LARYNGITIS.

Synonyms.—Membranous Croup; Laryngeal Diphtheria.

Definition.—An inflammation of the larynx, characterized anatomically by the formation of a false membrane; clinically, by a shrill, piping respiration, dry, metallic cough, the voice sinking to a whisper.

Etiology.—There has been much discussion as to whether membranous croup and laryngeal diphtheria are one and the same disease, and although it is now generally recognized by the profession as one disease, and although health officers require membranous croup to be reported as infectious, I am sure that I have seen cases where there is no evidence of infection and no symptom of diphtheria; hence it may be classed as non-contagious membranous croup.

As proof I report a recent case: I was called to see a child two years old who had been suffering, as I learned, for five days with cough and difficult breathing. Home remedies had been faithfully used, but the child grew gradually worse. At my first visit I found the child laboring for breath, interrupted by the dry, metallic, croupal cough; the cry was piping, and the labored breathing showed the opening of the larynx was very small. The tongue was but slightly coated, appetite good, no odor from breath, skin moist, secretions from kidneys and bowels good. In fact, had it not been for the labored breathing and croupal cough the child would have needed no medical aid. The membrane gradually lessened the caliber of the larynx, and, despite steam inhalations and internal medication, the child grew gradually worse so that intubation was required to preserve life. Within ten minutes after the tube was in place, the child dropped into a quiet sleep, the breathing was as quiet as that of a healthy babe, and, to all appearance, the disease was at an end. The tube was allowed to remain four days, during which time the child drank freely of milk, slept quietly, and made no complaint. There was not a single symptom of diphtheria.

The cause of *non-contagious* membranous croup is no doubt the same as that of catarrhal croup, although just why in the one case a plastic exudate is formed, it is impossible to say.

Pathology.—This is a true inflammation of the mucous membrane, which is attended by a plastic exudate, forming the pseudo-membrane, which varies in thickness from one-sixth to one-fourth of an inch, and consists of mucus, epithelial cells, and an obscure fibrous structure. In some cases it is but loosely attached, while in others it is removed with difficulty.

Symptoms.—"The coming on of an attack of pseudo-membranous croup may sometimes be recognized for three or four days, or even a week. The child does not seem sick, and plays about the house as usual, but has some cold, and the parents notice some hoarseness of voice and cough. We will notice, however, a peculiar metallic resonance to the voice, cry, and cough, but more especially that there is a dry and whistling respiration. This is so marked that the breathing may be heard across the room.

"The attack of croup most frequently comes on at night, as in other cases. In the evening it is noticed that there is more hoarseness of the voice and the cough is somewhat croupal, but as the child breathes pretty well and does not seem sick, the parents flatter themselves that it is but a cold, and will give no trouble. The mother has told me of going to the child's bed or crib, attracted by the peculiar whistling respiration, impressed that there was something wrong, but fearing ridicule if she sent for the physician.

"As the time passes, the child becomes restless from difficult breathing, has slight attacks of cough in his sleep, which are clearly croupal. In another hour or two he awakes with a start, and assumes a sitting position, evidently suffering much from difficult respiration, which is increased by the attacks of coughing.

"The symptoms are now very marked, the respiration is sibilus or whistling, and difficult, the cough hoarse and metallic, the voice roughened or sunk to a whisper, and the cry shrill and piping; the skin is dry, the pulse hard and increased in frequency, the urine scanty, and the patient restless and uneasy.

"As the disease progresses, there is a gradual increase of all these symptoms, but especially of difficult respiration, which is constant. The cough is spasmodic in its character, and when it

comes on, the patient suffers very greatly from want of air. After a time, evidences of asphyxia appear in the bluish lips, distended veins, leaden appearance of the surface, cold extremities, dullness of the nervous system, and finally coma and death.

"The entire duration of the final attack will be from six to forty-eight hours."

Diagnosis.—The constantly increasing difficulty of respiration, the whistling, sibilant sound of the air as it passes through the narrowed larynx, the dry, ringing, metallic cough, and the piping cry can hardly be mistaken for any other form of croup.

Prognosis.—This is a grave disease, and the prognosis must be guarded. In very young children the outlook is unfavorable, owing to the small size of the larynx. An unfavorable prognosis will be made where the pulse becomes small and feeble, the skin relaxed, extremities cold, the respiration gasping, and the face cyanotic.

Treatment.—I can not do better than reproduce the treatment as given in Scudder's "Diseases of Children," which is as follows:

"The indications of treatment in this case are: To produce relaxation of the intrinsic muscles of the larynx, and thus give freedom to the respiration while we pursue the main treatment; to lessen inflammatory action and obtain free secretion of mucus, for the purpose of effecting the detachment of the false membrane; and, finally, to effect the removal of this.

"To fulfill the first indication, we employ inhalations of the vapor of water, or water and vinegar, or lime-water, as will be hereafter named. With this we direct the continuous application to the throat of flannel cloths wrung out of hot water, in the meantime bathing the throat with the compound stillingia liniment. These are important means, and should never be neglected.

"There are two plans for accomplishing the second indication. The one is by the use of the tincture of *veratrum viride* or *aconite*, aided by inhalations of lime-water, and is very good treatment and much pleasanter than the use of *nauseates*. I prescribe the *veratrum* in the proportion of ten drops to water four ounces, a teaspoonful every fifteen minutes, until it produces a marked influence upon the pulse; then in smaller doses, to continue its effect.

"*Aconite* is preferred where the pulse is small and frequent,

and it is administered in the usual small doses: Tincture aconite, gtt. ii; water, iv ounces; a teaspoonful every fifteen minutes. If the child is very sensitive to the action of the remedy, the dose should be still further reduced, and if we find the lips dry and contracted, and the child grasping at its mouth with its hands, it should be suspended and veratrum administered.

"If the tongue is pallid, and shows small spots of red, phyto-lacca may be combined with the medicine. If the little patient is dull and stupid and wants to sleep, give belladonna. If there is a sharp stroke of the pulse, and the child moves its head restlessly backward and forward, throwing it backward as if it would bury the occiput in the pillow, give it rhus. This remedy is also indicated by the shrill cry as if frightened, and sudden starting from sleep. Gelsemium is indicated by the flushed face, bright eyes, and contracted pupils, with restlessness and great irritation. These remedies are secondary, it is true, but it is a case that requires all that we can do, and if by one of these we strengthen the aconite and veratrum, we give our patient an additional chance.

"What the physician needs most of all is a steady hand. The treatment requires time, and we must not get excited. If the patient is growing no worse, we should feel satisfied for a time; if there is but slow improvement, as marked by more ease of respiration, a better circulation, warmth, and moisture of the feet, legs, and forehead, we feel encouraged, and hold fast to the treatment.

"The use of lime-water as an inhalation is a very important part of the treatment. It is claimed that it alone is sufficient to arrest the inflammatory action and cause the detachment of the membrane; and I have employed it with success when other means have failed. The veratrum has also proven very successful alone, and the two will fulfill the first two conditions.

"The other and older plan of treatment is by the use of the nauseant emetics, and, if properly used, will give excellent results. I may add that if improperly used—*i. e.*, so as to irritate the stomach with retching and ineffectual efforts to vomit—they will hasten the fatal termination.

"Of these remedies I prefer: \mathcal{R} Acetous tincture of lobelia, acetous tincture of sanguinaria, aa, \mathfrak{z} i; molasses, \mathfrak{z} j; chlorate of potash, finely powdered, \mathfrak{z} ss; let them be combined with heat, and add the potash. We give this in doses of a teaspoonful every ten

or fifteen minutes, until nausea is induced; then in smaller doses, so as to continue the nausea without vomiting. The greater and more constant the nausea without efforts at vomiting, the greater the success of the treatment.

"Using the hot applications to the throat, and the inhalations of vinegar and water, we continue the nausea for some hours, at least until we have evidence of secretion, and the commencing detachment of the false membrane. This will readily be detected by the moist sound of respiration, and a gurgling, flapping sound in the act of coughing. If the child is breathing pretty freely, we may wait for the removal of the membrane by the cough, as it will be brought away by shreds.

"But if, with the loosening of it, it seems to be drawn upward in expiration, and downward with inspiration, tending to block up the passages and producing evident symptoms of asphyxiation, we carry our remedies to thorough and prompt emesis.

"Generally it will be well enough to prepare an infusion of the compound powder of lobelia and capsicum for use at this time, as we will have established a degree of tolerance for the other preparation. Occasionally we will meet with a case requiring prompt relief. Here the child will be turned on its abdomen; and a finger introduced into the mouth, drawing the tongue forward, and exciting the fauces, will be followed by a forcible expulsive effort, and the membrane will be detached. A case of this kind occurred in my practice; the membrane became detached and entirely stopped the larynx, the child was asphyxiated, and would have died in five minutes. I snatched it from the mother, turned it on its face, inserted my finger as far down as the larynx; a forcible effort at vomiting ensued, and the whole membrane was removed at once, being a perfect cast of the larynx. The child recovered.

"To the above treatment I would add the nitrate of sanguinaria when the membrane becomes loosened and is coughed up in small shreds: \mathcal{R} Nitrate of sanguinaria, 1-8 gr.; rub in mortar with boiling water, $\mathfrak{z}\text{iv}$; when dissolved, add a teaspoonful of good, sharp cider-vinegar. The dose is a teaspoonful every hour.

"Where the child grows worse despite the above treatment, and struggles for breath, intubation should be performed. The tube should remain three or four days.

"Convalescence demands much care. The child should avoid

draughts of air. A good tonic should be administered and stillingia liniment or potassium bichromate given for hoarseness that follows, and to strengthen and tone up the weakened laryngeal tissues."

III. DISEASES OF THE BRONCHI.

ACUTE BRONCHITIS.

Synonyms.—Tracheo-Bronchitis; Cold on the Chest.

Definition.—An inflammation of the mucous membrane of the bronchial tubes, varying greatly in intensity; hence it has received different classification. Thus, in the milder forms, it is termed subacute or cold on the chest; in the more severe types, acute or sthenic bronchitis, while in elderly people and those of feeble vitality it is termed asthenic bronchitis. The inflammation also involves the mucous membrane of the trachea; hence the more proper name, tracheo-bronchitis, and where the disease is actively acute, the nares, pharynx, and larynx share in the inflammatory process.

Formerly the extension of the inflammation to the bronchioles was termed capillary bronchitis; but as this is attended with an involvement of the air-cells, giving us pneumonia as well, it is now classed as broncho-pneumonia. Should the inflammation stop short of the lungs, capillary bronchitis would be a proper term. The disease is both acute and chronic.

Etiology.—Among the predisposing causes are: Age, children, and elderly people being very susceptible; debility, resulting from malnutrition; defective drainage, poor ventilation, overcrowding, insufficient food and clothing, or other diseases; occupations, certain trades, whereby irritant particles are inhaled, such as steel, brass, wood, coal, and tobacco working, etc.; also the fumes of sulphurous acid, chlorine, and bromine. Sedentary habits also render one more susceptible than a more exposed life. Children shielded from every draft of air by overanxious mothers, and who wear an excess of woollens whereby the system is weakened, are very susceptible to inflammatory conditions of the chest.

The exciting cause is usually atmospheric changes; sudden

changes in the weather, which so frequently occur in the spring and fall, whereby the patient catches cold, are fruitful sources. Also getting the feet wet, or sudden chilling after exertion, may insure the disease. There is also an epidemic condition different from influenza, that prevails during some seasons.

Bronchitis is also a common attendant on some diseases, as typhoid fever, whooping-cough, measles, and other exanthematous affections. The disease may be acute or chronic.

Pathology.—The mucous membrane of the trachea and bronchi is congested and swollen, at first dry, but soon covered with mucus, which at first is clear, glairy and viscid, but soon becomes opaque, and finally muco-purulent. There is swelling of the mucous glands, and some of the smaller bronchial tubes are dilated; in the more severe cases the smaller tubes are choked with mucus. The ciliated epithelium desquamates and the sub-mucosa becomes infiltrated with leucocytes.

Symptoms.—Simple catarrhal bronchitis, or cold on the chest, begins as a common cold; there is languor, with frequent chilly sensations, which are alternated with flashes of heat. There is increased secretion from the nose; the throat is dry and rough, which causes the patient to make frequent attempts to clear it. The voice is hoarse, and a short hacking cough soon develops. The skin is dry, the urine scanty, and there is constipation.

As the cough develops, there is a sense of constriction of the chest, with a dull pain in the median line. The first twenty-four or forty-eight hours the cough is tight, and there is but little expectoration, the mucus being clear and viscid; but within another twenty-four hours the cough is not so dry and hard, the mucus becomes more profuse, changes color, becoming yellow, and is raised more easily. There is now an abatement of all the symptoms, and the patient is convalescent by the sixth or eighth day. In the more acute forms the chill is quite marked, followed by an active grade of fever.

The skin is hot, dry, and constricted, the urine is scanty and high-colored, and there is constipation. The throat is dry, red, and somewhat swollen, the voice hoarse and rough. A hard, dry bronchial cough follows reaction, which is attended by a dull pain in the chest. The respiration is humid, and there is a sense of oppression in the chest. The tongue is coated, and there is more or less headache.

The fever may be quite active, although remittent in character. On auscultation the dry, sibilant rhonchus is heard, followed within forty-eight hours by a mucous rhonchus, which becomes more marked as secretion increases. At first the mucus is viscid and tenacious and sometimes streaked with blood, but soon changes, becoming opaque and finally muco-purulent. With free expectoration, the sufferings of the patient are relieved; he sleeps well, the cough being more severe in the early morning, owing to accumulation during the night.

When occurring in young children and in elderly people, the prostration is much greater, the cough harassing, greatly distressing the patient. The respiration is more labored, and there is more or less dyspnea. The expectoration in the old is more watery in character. The cough is persistent, occurring in paroxysms. In children the inflammation is more apt to extend to the smaller tubes, and the oppression of the chest is consequently great. The respiration is embarrassed. Auscultation gives mucous rhonchus, the smaller tubes being choked with mucus.

Diagnosis.—The diagnosis is easily made. The coryza, dryness of throat, the dry bronchial cough, and sibilant respiration, call our attention to the chest. Auscultation gives us the dry rhonchus the first twenty-four hours, followed by the mucous rhonchus. Percussion gives resonance, showing conclusively that the lungs are not involved.

Prognosis.—The prognosis is generally favorable, though where it occurs in delicate children there is a marked tendency in the inflammation to extend to the lung, giving rise to bronchopneumonia. In old and feeble patients whose vitality has become exhausted, the prognosis will be guarded.

Treatment.—The treatment for bronchitis by the use of specific remedies is very satisfactory; the disease is shortened, the distress mitigated, and the patient rendered comfortable without the use of opiates. Our first object is to control the fever, thereby arresting the inflammatory process; just in proportion as we are able to modify the symptomatic fever, do we modify the cough, and early establish secretion.

Veratrum.—In acute inflammation of the respiratory apparatus, there is usually excessive power in the heart's action as

evidenced by the full, bounding pulse, and veratrum in full doses succeeds, not only in reducing the force and frequency of the pulse and lowering the temperature, but also modifies the cough. Veratrum, gtt. xx-xl; water, ℥iv; aconite where the pulse is small and frequent, either in child or adult, calls for this agent. Aconite, gtt. v; water, ℥iv. Teaspoonful every hour.

Bryonia.—This is one of our best cough remedies, and is called for where there is pain in the chest, sharp in character, a *vibratile* pulse being additional evidence for its use, ten drops added to the sedative mixture, or it may be given on alternate hours.

Lobelia.—Where there is dyspnea and a sense of oppression in the chest and the pulse is full and oppressed, this remedy will be especially useful. In children, where the smaller tubes are choked with mucus, there is no better agent; ten or fifteen drops being added to the aconite mixture.

Eupatorium.—This will be useful in those cases where the temperature is high, yet the skin is inclined to be moist, and the pulse is full and respiration difficult; add ten to twenty drops to the half glass of water.

Sanguinaria.—Where there is a constant tickling in the throat, this agent will be of use. Put one-fourth grain of the nitrate of sanguinaria in mortar, and rub it down with four ounces of boiling water; add enough syrup to render palatable, and give teaspoonful every hour.

Ipecac.—Where there is irritation of any mucous membrane, ipecac will be found beneficial. Where there is extension to the lung tissue and the cough is hacking in character, add ten drops to the usual amount of water, and give every hour.

Local Applications.—The only local application needed will be the flannel cloth spread with lard or vaselin and thoroughly dusted with the compound emetic powder. Where this produces too much counter irritation, rub throat and chest with stillingia liniment. The antiseptics are not usually called for in this disease, although there may be an occasional call for them. Good nursing is, of course, necessary. The patient must be kept quiet in bed, and a fluid but nourishing diet administered. The patient should not be dismissed until the cough is thoroughly subdued; if this course were carried out, there would be fewer cases of chronic bronchitis.

CHRONIC BRONCHITIS.

Definition.—An inflammation of the mucous membrane of the trachea and bronchi, that has existed beyond the period of acute inflammation, and has lost the acute symptoms of sthenia. It may be primary, following the acute or secondary.

Etiology.—Chronic inflammation is of frequent occurrence, and may result from many causes. A badly treated acute bronchitis or one where the patient stops treatment before a thorough cure is effected, often results in the chronic form. Neglect is a very common cause; the acute symptoms giving way, the patient, in his hurry to be about, pays but little heed to his cough, and before he realizes it, it has become firmly established. Sometimes it comes on very slowly; the patient coughs in the winter and spring whenever exposed to cold, but with the arrival of pleasant weather the cough disappears, to return more severely with the first attack of cold weather; by the following spring the chronicity is so well established that fair, pleasant weather, while mitigating the paroxysms, does not entirely relieve the sufferer, and the disease is well established.

Again, a pneumonia may set up a subacute bronchitis, which persists after the primary lesion has subsided.

Organic heart disease, especially of the right heart, is sometimes responsible for this condition, as may be chronic Bright's disease. Rheumatism, syphilis, tuberculosis, and chronic alcoholism may also be important factors in giving rise to the disease.

Old people are very prone to this affection, especially if they are sufferers from any organic disease and are not carefully sheltered in inclement weather. Children are not often troubled, unless it follows whooping-cough or measles.

Pathology.—The mucous membrane presents very different conditions. In some, the epithelial layer will have disappeared over a large surface, the mucous membrane becoming quite thin, or there may be thickening of the mucous membrane, with infiltration; in others, there is more or less ulceration. Again, there will be atrophy of the mucous follicles, dry bronchitis; in others, hypertrophy, with increased secretion—bronchorrhea.

The mucous membrane presents a livid violet color, in the place of the light red of the acute form. Where the disease is of long standing, with severe paroxysmal coughing, there is dila-

tation of the tubes, bronchiectasis. The changes in other organs are not so constant, being secondary and the result of complications.

Symptoms.—In chronic bronchitis we have to consider both local and constitutional symptoms. Of the local, the cough, the expectoration, and the respiration are the most prominent. Cough is the most troublesome and characteristic feature, being persistent and annoying, usually of a deep bronchial character, or short and hacking; again, asthmatic, with difficulty in breathing, causing exhaustion. It may be dry and ringing in character where but little mucus is secreted, or moist and loose where the secretion is profuse.

There is generally but little pain, although, when the paroxysms are difficult and long continued, there is soreness in the substernal region. The expectoration varies greatly in regard to quantity, appearance, and consistency, depending upon the type of the disease, of which there are three forms: (a) Dry catarrh, the *catarrhe sec* of Laennec; (b) Bronchorrhea serosa; (c) Putrid bronchitis.

Dry Catarrh.—This form is characterized by severe and prolonged paroxysms of coughing, but attended by little or no expectoration; the expectoration, when present, is tough and viscid and removed with difficulty. After the paroxysms, the respiration is hurried and asthmatic, the face being flushed and the patient quite exhausted. This form is usually found in elderly people. There is often emphysema, and not infrequently heart disease is associated with this type.

Bronchorrhea.—In this form, the secretion is profuse and expectoration abundant and easily expelled; each paroxysm of coughing is attended with a free expectoration of a watery character, muco-purulent, or fetid and of a greenish color. Where the mucus is purulent and offensive, it may be the beginning of dilatation of the tubes and fetid bronchitis. From two to four pints may be expectorated in twenty-four hours. After a night's rest the paroxysms of coughing are prolonged and severe, in order to remove the accumulation of the night.

Putrid Bronchitis.—In this form the expectorated material is abundant and fetid, the odor being characteristic of the decomposition of animal matter. This may be associated with tuberculosis of the lung, empyema with lung perforation, dilatation of the

tubes, abscess or gangrene of the lung, although the odor may be present independent of these. "The expectoration is usually copious, and, upon standing, separates into three layers, of which the uppermost is composed of frothy mucus, the intermediate of a serous liquid, and the lowest of a thick sediment which presents a granular appearance, and is made up chiefly of small yellow masses, the so-called Dittrich's plugs. These plugs are characteristic of fetid bronchitis, and are the causes of the fetor. On microscopic examination, the Dittrich's plugs are seen to be composed of micro-organisms, chief among which is the *Leptothrix pulmonalis*; they may also contain pus corpuscles, fat granules, and crystals of margaric acid. (Anders.)

Physical Signs.—The physical signs depend upon the type, but are so characteristic that, taken with the symptoms above described, a diagnosis is readily made. Thus, in the dry form, auscultation reveals a dry, whistling, or sibilant rhonchus, and, upon percussion, a resonance is elicited showing that the lungs are not involved. Where the secretion is profuse, the mucous rhonchus is heard, and if the smaller tubes are involved, a slight crepitant sound may be heard. Where there is great relaxation of the mucous membrane, with the secretion increased, a flapping or gurgling sound is heard.

General Symptoms.—These depend upon several conditions. If there is no serious complication, the general health may be but little affected and the patient may follow his vocation with but little interruption. There is usually more or less emaciation, but aside from this, and a hurried respiration after exertion, he complains but little.

Where there is organic complications, the symptoms peculiar to the affected organ are generally so prominent that our attention is at once directed to it. Thus cardiac trouble would be known by the sense of weight and oppression in the region of the heart, the dyspnea being a marked symptom. The pain of rheumatism and gout are characteristic, while Bright's disease has a train of symptoms that are not misleading.

Where the lungs become involved, especially if the disease is of years' standing, the patient rapidly loses flesh and strength, is compelled to take to his bed, hectic fever and night-sweats follow, and the patient's condition resembles that of phthisis.

Diagnosis.—The diagnosis is usually made with but little difficulty, the only disease with which it might be confused being phthisis, and if we bear in mind that in phthisis there is fever and loss of flesh and great prostration, while in bronchitis the health is comparatively good, we can distinguish the two without much difficulty. In phthisis we get localized dullness, usually in the apex, while in bronchitis there is resonance on percussion. The history will also throw much light on the case, although the physical signs are the ones upon which most dependence is to be placed.

Prognosis.—The prognosis will depend upon the length of time the patient has been affected, his previous history, and the complications existing. Bronchitis being so many times secondary to diseases that of themselves are serious, our prognosis must be guarded.

Treatment.—One who can profit by our advice we would send to Southern California or Florida for the winter months, for nothing can take the place of change of climate,—a warm, even temperature, where the patient can remain out of doors the most of his time, being especially desirable. Unfortunately the greater number of our patrons can not bear the expense, and we have to do the best we can at home. Except in inclement weather, our patient must have plenty of outdoor air; but when the weather is wet and disagreeable, we must insist on his keeping indoors.

His sleeping apartment should be large and well ventilated. In the morning the patient is to flush the neck and chest with cold water, to be followed by thorough rubbing with a dry, coarse towel, till the skin has a healthy glow and all moisture disappears.

All nauseating remedies should be avoided, as we do not wish to disturb the stomach; for in order to make a good blood—an important factor in the treatment—we must have good digestion. We must also see that the excretory organs are in good condition.

The general treatment would look to a correction, where possible, of the primary lesions. The diet should be nourishing and easily digested, while pastries and rich desserts should be avoided. The bitter tonics and restoratives may be called for; yet, unless each remedy is given for a direct purpose, our patient will fare better without them. The cough is the most distressing feature,

and one that calls loudly for relief. This will yield more satisfactorily to direct medication than by giving the usual expectorant compounds.

Drosera.—Where the cough is dry and hoarse, add from fifteen to thirty drops of drosera to half a glass of water. A teaspoonful every one or two hours will give good results.

Sanguinaria.—Where there is laryngeal irritation, a tickling in the throat, and a persistent cough, sanguinaria must not be overlooked, as it is one of our best agents for this condition.

Sticta Pulmonaria.—Where the cough is hard and dry, sticta alone, or in combination with bryonia, will be the remedy.

Ammonium Carbonate.—Where the mucous membrane is relaxed and the secretion profuse, from three to six grains of the carbonate of ammonium will give good results; syrup of tulu and simple syrup may be the vehicle for its administration.

Calcium Sulphide will be the remedy in fetid bronchitis. Where the cough is irritable and persistent, preventing sleep, an opiate may be necessary. In such cases,

℞ Codein sulphate.....grs. v.
Syrup Tulu℥ii. M.
Sig. Teaspoonful every one, two, or three
hours.

Inhalations will be of much benefit, where there is but little secretion, there being dryness of the mucous membrane. If the larynx be involved, it will be doubly indicated. Steam inhalations, in which eucalyptus, lobelia, and hops are used, will prove very helpful.

• Stillingia liniment in drop doses on sugar is a good remedy for a night cough. *Esculus glabra* is an excellent remedy where there are asthmatic symptoms.

A persistent hacking cough will frequently yield to the following cough mixture when all others fail:

℞ Specific Lobelia.....℥i.
Comp. Spirits of Lavender.....℥ii
Water.
Simple Syrup.....aa ℥ii. M.
Sig. Teaspoonful every one, two, or three
hours.

Counter Irritation.—The older practitioners obtained splendid results from the old compound tar plaster, though few patients

to-day would suffer the use of it. In the place of this, we may use a thapsia plaster.

BRONCHIECTASIS.

Definition.—Dilatation of the Bronchial Tubes.

Etiology.—Any condition that impairs the vitality and tonicity of the mucous tissues predisposes to bronchiectasis, for dilatation depends upon a weakened condition of the mucosa, sub-mucosa, and muscular tissues, whereby they atrophy, permitting the weakened tube to dilate.

Age also favors the disease, being most common in adult and middle life. Sex also predisposes to this condition, males suffering much more frequently than females.

The disease is usually the result of chronic bronchitis, chronic phthisis, broncho-pneumonia, emphysema, influenza, and sometimes it is due to measles and whooping-cough.

It may be due to a pressure from an aneurism or tumors, and where the walls are greatly weakened, the presence of heavy mucus may be sufficient to cause dilatation.

In rare cases it is congenital.

Pathology.—The disease may be general or local, and the dilatation may be cylindrical, saccular, or irregular, all forms of which may be seen in the same lung.

In rare cases, the dilatation is confined to a single tube, and may affect but one side, though usually the entire circumference of the walls share in the change.

The most common form is where many of the tubes are involved, the dilatation commencing at the second or third division, and continuing throughout as a cylindrical or saccular enlargement combined.

The mucous membrane, in rare cases, may remain unchanged, though generally there is thinning or atrophy. Occasionally the mucous membrane is congested and thickened, the result of the inflammatory action. The cylindrical epithelium may be replaced by pavement epithelium.

There is usually a thinning of the muscular tissues, though, in rare cases, there may be thickening due to inflammatory changes. The contents of these cavities vary both in quantity and

quality. In some the mucus appears but little changed, though more profuse than in health, while in others it shows great deterioration; in fact, is composed of blood, pus, and not infrequently pulmonary tissue, and casts of the tubes; in such cases it is very fetid. Still in others, the mucus becomes inspissated and sometimes calcified. Ulceration sometimes occurs in the most dependent portion of the cavity. There is usually a diseased condition of the near pulmonary tissue, the change depending largely upon the primary disease causing the dilatation.

Symptoms.—The general symptoms present a wide range, depending upon the primary lesions and enfeeblement of vitality occasioned by them. The most characteristic symptom is the paroxysmal cough occurring in the morning, after a night's rest, to remove the accumulated secretion that has taken place. Change of position, when lying down, may bring on a paroxysm of coughing, by emptying the contents of a cavity into the tube above it.

The expectorated material is usually of a brownish or greenish color, muco-purulent in character, and disgustingly fetid. On standing, it separates into three layers,—an upper, which is brown and frothy; a middle, thin, sero-mucus; and a lower, consisting of granular débris. Examined microscopically, the sputum is found to contain pus cells, oil globules, fatty acid crystals, fragments of lung tissue, and various micro-organisms.

Dyspnea occurs after severe exertion, though respiration is but little disturbed when the patient is at rest. Hemorrhage seldom occurs, though at times the sputum may be streaked with blood.

Physical Signs.—The physical signs depend upon the size of the cavities, their location, superficial or deep, whether empty or filled with secretions, and also the condition of the lung tissue.

Auscultation reveals amphoric sounds where the cavity is large and empty. Mucous rales are heard over various portions of the chest.

Percussion.—After a fit of coughing the cavity is emptied, and percussion at this time gives a high-pitched tympanitic note; when the cavity is full, the percussion note is dull. Deep-seated cavities are not easily detected by percussion.

Diagnosis.—The diagnosis is not always easy, though the physical signs already mentioned should enable one to make but few mistakes. The cavities are to be differentiated from tuber-

cular cavities; but if we keep in mind certain characteristics of each disease, there will be but little difficulty.

The cavity in bronchiectasis is nearly always located in the *base* of the lung, and the physical signs most prominent *posteriorly*; while in tuberculosis the cavities are usually found in the *apex* of the lung, and the physical signs are most prominent *anteriorly*. Sputum is foul, abundant, and devoid of tubercle bacilli in bronchiectasis. In tuberculosis, the sputum is often blood-streaked, is not so fetid, and is rich in tubercular bacilli. In bronchiectasis there is *no fever, no sweating*, and the patient is in better flesh. In tuberculosis, fever, night-sweats, and emaciation are characteristic. In one the history is that of bronchitis; in the other, that of tuberculosis.

Prognosis.—Unfavorable as to cure, though the patient may live for years.

Treatment.—The general health of the patient must be maintained, and the administration of the bitter tonics, the hypophosphites, iron, arsenic, and like remedies will form a part of the general treatment. A warm, equable climate is desirable, where the patient can be out of doors the most of the time.

Calcium sulphide will be indicated to counteract the suppurative processes which are continually present. Inhalations of eucalyptus, iodine, creosote, turpentine, carbolic, etc., will correct to some extent the fetid breath, and incidentally benefit the patient.

ASTHMA.

Synonyms.—Spasmodic Asthma; Nervous Asthma; Bronchial Asthma.

Definition.—A paroxysmal dyspnea, due to alterations in the smaller bronchial tubes of a spasmodic and temporary character, and attended by more or less constitutional symptoms.

Etiology.—Heredity, sex, season of the year, and age predispose to asthma. It has been estimated that in fifty per cent of all cases there is a family history of paroxysmal dyspnea. More males suffer from asthma than females, the ratio being about two to one. If we except hay asthma, winter and early spring are the months most favorable to this disease.

About thirty per cent of all cases occur before the age of ten, twelve per cent between the ages of ten and twenty, and eighty per cent before the age of forty.

Exciting Cause.—All writers agree that there is an abnormal condition of the respiratory center or of its paths of communication, but the exact nature of the exciting cause or causes is not known.

It may be due, in some cases, to bronchial irritation, or acute bronchitis; at least this may give rise to a paroxysm. Inhalations of certain vapors or fumes, or irritating dust, and sometimes the odor of plants or animals, is sufficient to bring on an attack.

A very large per cent of cases are due to reflex causes, the disturbance being at a distant part, as the stomach, uterus, ovaries, urethra, or rectum. Emotional excitement may be the excitant, or it may be secondary to obstructive rhinitis, or growths in the nasal passages, cardiac lesions, hepatic wrongs, and chronic nephritis.

Pathology.—There are no characteristic anatomical changes in asthma. In some there is hyperemia of the bronchial mucosa, with a characteristic exudate. In others there may be slight thickening of the mucosa, and in a great many there are no perceptible changes, showing clearly its reflex character.

Where the disease is secondary, the anatomical changes are confined to the primary organ; as in cardiac asthma, the changes will be in the heart; in renal asthma, in the kidneys, etc.

Symptoms.—The attack generally begins suddenly, though prodromal symptoms are not uncommon, and consist of a sensation of uneasiness or constriction in the larynx, oppression or tightness in the chest; chilly sensations, digestive disturbances, profuse diuresis, and marked depression of spirits.

The attack most frequently commences in the night, after the patient has gone to sleep, he being awakened by a sense of suffocation or inability to fill his lungs. The dyspnea is marked, and the patient desires his window thrown open that he may get fresh air. There is great anxiety; the face becomes pale, often cyanotic, showing imperfect aeration of the blood; the pulse is rapid but feeble; the face, and sometimes the entire body, is covered with a cold sweat; the extremities become cold, and the temperature not infrequently becomes subnormal. The patient is unable to lie down, the most comfortable position being a sitting

posture, the hands grasping some object for support, thus bringing to his assistance the accessory muscles of respiration.

The breathing is characteristic, being of a wheezing character that can be heard for quite a distance. Although, owing to spasmodic contraction, the air enters the lung with difficulty, the patient experiences still greater labor in expiration or emptying the lungs, the wheezing being more pronounced on expiration than on inspiration.

The dyspnea is increased by paroxysms of coughing, which at first are quite severe and attended by expectoration of a tenacious viscid mucus. Later the cough is looser and the mucus raised with ease.

The sputum of asthma is characteristic and consists of small, jelly-like balls floating in their mucin. These balls, "perles" of Laennec, are mucous molds of the small bronchioles, and when unrolled are found to be spiral in form, known as Curschmann's spirals, he being the first to describe them. There are also found in many cases, octahedral crystals, asthma crystals, first described by Leydon. They are identical with the crystals found in semen and in the blood in leukemia.

Physical Signs.—Inspection reveals the chest large and barrel-shaped, due to inability to expel the air from the lungs.

Percussion usually gives hyper-resonance, though sometimes the note is normal.

Auscultation in the early stage reveals sibilant rales, of various grades in pitch, becoming moist as the disease progresses.

The duration of the paroxysms is variable, lasting from a few minutes to hours, or days. Often the patient experiences relief toward morning, and through the day is comparatively comfortable, although the breathing is hurried. The following night there is a repetition of the experience of the previous night, which may continue for several nights before obtaining complete relief. Sometimes months elapse before there is a recurrence, the frequency depending somewhat upon the exciting cause.

Diagnosis.—The diagnosis is easy, the paroxysms of dyspnea usually occurring in the night, the wheezing respiration and the peculiar sputum, leave no room for doubt.

Prognosis.—The prognosis is favorable as to life, but few patients dying from asthma, and only those where it is due to primary cardiac lesions; but it is unfavorable as to a permanent cure,

unless due to reflex causes, when a correction of the exciting cause may give prompt and permanent relief.

The permanent cures from medication, however, are not frequent enough to warrant a cure by the use of remedies.

Treatment.—The treatment of asthma will be first to relieve the paroxysm, and then to ascertain, if possible, the exciting cause, and direct our treatment toward a permanent cure.

Lobelia is recognized by all schools as an efficient remedy during a paroxysm of asthma. To be effectual, however, it should be carried to the point of nausea, and when the paroxysm is due to an overloaded stomach, it should be carried to a thorough emesis. An infusion of the emetic powder is quite effective where emesis is desired.

Perhaps the most successful agent is morphia, used hypodermically, one-fourth to one-third of a grain being used at a dose. The most serious objection to this remedy is the danger of leading the patient into the morphine habit.

The inhalation of chloroform will frequently give relief, but the effects are apt to be transient. One or two perles of the nitrate of amyl, crushed in the handkerchief and inhaled, usually gives speedy relief. The patient should be in bed when this is used, for the agent often produces dizziness and sometimes fainting, and if not in bed the patient may fall to the floor. In very difficult breathing the agent may be given internally, a dram to simple syrup and water, aa \mathfrak{z} i. M. Teaspoonful every three or four hours.

Inhalations from cigarettes made from lobelia, belladonna, and stramonium leaves proves of much benefit in many cases, or the coarsely ground herbs may be burned in a dish and the fumes inhaled. Nitrate of potassium may be added to the other agents, and adds much to its effectiveness.

For the radical cure the case must be carefully studied, to find the exciting cause or causes that give rise to it. In one case it may be due to endometritis or a diseased ovary; in another, rectal or urethral disturbances are responsible for the paroxysms. In such cases, a curettement, or possibly an ovariectomy, will be the only means of relief, while the removal of hemorrhoids, papilla, rectal pockets, fissures, etc., will work wonders in effecting a permanent cure.

Any wrongs in the general health must be corrected, and such

remedies as *esculus*, *grindelia*, and *penthorum* may be given three or four times a day with the hope of overcoming the tendency to a return of the disease.

The nose, larynx, and bronchi should receive a careful examination, and if any local trouble exists, it should be removed. The patient should be shielded from irritating dust, pollen, gaseous or chemical fumes, and any and all forms of irritation.

In some cases a change of climate promises the only relief, although it is difficult to determine the right locality for each patient. One does better in the mountains, while another derives more benefit in the lake regions of Wisconsin and Michigan, while the States of Florida, Texas, New Mexico, Arizona, Colorado, and California offer relief to others.

FIBRINOUS BRONCHITIS.

Synonyms.—Pseudo-membranous Bronchitis; Croupus Bronchitis; Plastic Bronchitis.

Definition.—An acute or chronic inflammation of the bronchial tubes and characterized by the formation of a false membrane or fibrinous casts.

Etiology.—Certain conditions predispose to this affection, although the specific cause is not known. It occurs far more frequently in male subjects than in the female, and between the age of twenty and forty, although it may occur at any period of life, and follows the breaking up of winter, or the early spring months.

It is associated with tuberculosis and certain skin diseases, such as pemphigus, impetigo, and herpes. Heredity may play some part in its causation. The inhalation of steam and noxious gases is sometimes followed by plastic bronchitis; while erysipelas, scarlet fever, and other infectious diseases have preceded it.

Pathology.—The exudate or pseudo-membrane is usually found in the large tubes, although not infrequently involving the smaller branches. The exudate is found upon the mucous membrane, and forms casts of the tubes. These casts may be hollow or solid, being filled with leucocytes, blood corpuscles, epithelial cells, and sometimes the Charcot-Leydon crystals.

The composition of the casts is not very well understood, although generally believed to be fibrinous. The casts are ex-

pectorated in the form of jelly-like mucus, and when placed in water may be unrolled, revealing the casts of the bronchi.

Symptoms.—The acute form, which is quite rare, may result fatally in a short time, owing to the dyspnea, due to occlusion of the bronchi. It begins with a chill or rigor, followed by high febrile reaction. The pulse is sharp and frequent, the respiration hurried, with a sense of constriction in the chest. Dyspnea early comes on, attended by paroxysms of coughing. At first the cough is dry, with but little expectoration, though often of a bloody character. Soon secretion becomes more profuse, and a paroxysm of coughing is followed by expectoration of some of the casts, not infrequently a profuse hemorrhage following.

With the subsidence of the fever, the secretion becomes more free, the dyspnea disappears, and the patient is convalescent. On the other hand, the obstruction may be so great as to lead to fatal asphyxiation.

Chronic Form.—The chronic form is usually milder in character and recurs at regular intervals. The earlier symptoms are those of ordinary bronchitis; but as the disease progresses, dyspnea becomes more marked and the cough paroxysmal in character. Expectoration is more profuse than in the acute form, the jelly mass expectorated revealing complete molds of the tubes. The casts may be found mixed with pus and blood.

The general symptoms are the same as those of chronic bronchitis. The physical signs do not differ materially from those of ordinary bronchitis. At first the dry, sibilant rhonchus is heard, changing to the mucous, as secretion becomes established.

Diagnosis.—The diagnosis is made from ordinary bronchitis by the greater dyspnea, the paroxysmal character of the cough, and finding the casts when the sputum is placed in water. From diphtheria, by the laryngeal complication and grave systemic symptoms of the latter.

Prognosis.—The acute form is a grave disease, and the prognosis should be guarded. The chronic form generally results favorably, although attacks may recur for years. Where there is a history of tuberculosis the outlook is not so favorable.

Treatment.—The treatment in the acute form will be similar to that of pseudo-membranous croup, the object being to soften and dislodge the membrane. Inhalations of medicated steam, produced by adding eucalyptus, lobelia, hops, and remedies of

like character, to boiling water, will be found beneficial. Inhalation of lime-water is also to be advised.

Internally, lobelia or the old antispasmodic tincture will be found useful. With the loosening of the membrane, sanguinaria will be found helpful as a stimulating expectorant. The chronic form will be treated on the same lines as chronic bronchitis. The general health must be improved, and the local treatment will correspond with that for the chronic form.

IV. DISEASES OF THE LUNG.

LOBAR PNEUMONIA.

Synonyms.—Croupus or Fibrous Pneumonia; Pneumonitis; Lung Fever; Inflammation of the Lungs, and Winter Fever.

Definition.—From time immemorial, the term pneumonia has been used to designate an inflammation of the parenchyma of the lungs as distinguished from inflammation of other parts of the respiratory apparatus.

The more modern definition would be: an acute infectious disease, characterized by an inflammation of the lung tissue, in which there is, first, congestion or engorgement; second, exudation or consolidation; and, third, resolution or suppuration.

General Remarks.—One has but to consult the census reports in order to be convinced that pneumonia is the most widespread and fatal of all acute diseases. There are few countries, indeed, where the death rate per one thousand does not run from 1.10 to 2.30 per cent, and the mortality ranges from ten to forty per cent. In the United States, strange to say, the death rate is higher in the Southern States than in the Northern.

Another unpleasant fact, according to the census reports of 1870, 1880, and 1890, is that the death rate has slightly increased, and that in the State of Massachusetts, from the year 1852 to 1894, there has been a progressive increase in the death rate. Osler, in his late addition, gives the mortality of pneumonia at from twenty to forty per cent.

To one who has practiced Eclecticism, especially specific medication, this mortality seems almost incredible, and one is ready to believe that, just in proportion as the medication is heroic, the

death rate increases. The disease is usually confined to one lung, when it is called single pneumonia; when both are involved, double pneumonia.

Etiology.—Predisposing causes are age, sex, season, habits, environment, race, and previous attack.

Age.—While no age is exempt, the extremes of life are more liable to the disease. The greatest number occur before the fifth year, and perhaps the least number between the ages of ten and fifteen years, and from this age increasing with each decade.

Sex.—That sex predisposes to pneumonia is readily shown by consulting the census reports, and while this is explained in adults by greater exposure to inclement weather by males, and also to greater intemperance in the latter, it does not explain the greater frequency in male infants.

Race.—The colored race are not only more prone to pneumonia, but the mortality is also greater.

Season.—Pneumonia prevails more largely during the months of December, January, February, and March, beginning in December and reaching its climax in February and March; but few cases occur between the months of April and November.

Climate.—Climate, perhaps, acts less as a predisposing cause than season, though reports show a slight increase in the number of cases in the Southern States over those above the thirty-ninth parallel.

Habits.—The drink habit has made giant strides during the last fifty years in all the countries of the world, and the drink bill of the United States, according to official reports of the past year, amounted to one billion dollars. This amount of alcohol was consumed in fermented and distilled liquors, to say nothing of that vast amount consumed in patent medicines, with which this country is flooded, and which the American people so blindly consume. Add to this a billion-dollar tobacco-bill and a growing cocaine and morphine habit, and some light is thrown on the increased mortality.

Alcohol, nicotine, and the narcotic drugs enter the blood and are carried to every tissue of the body, impairing the vitality of the whole. Alcohol diminishes the sensibility and activity of all nerve cells, and, by combining with the free oxygen of the blood, impairs that vital stimulant and renders it less efficacious in the

tissue changes of which it is so large a factor. Taken day after day, even by the so-called moderate drinker, the blood loses its vivifying qualities, the natural metabolic changes are impaired, toxic agents are retained, and the power of vital resistance to pathogenic germs or toxins materially lessened. Not only this, but the offspring of the moderate drinker comes into the world handicapped by a more feeble resisting power than that of the abstainer. If this follows the moderate use of alcoholic drinking, what are we to expect from the habitual immoderate drinker? Drunkenness tends to poverty with all its attendant ills; poorly clothed, poorly housed, and poorly fed children make up a very large class in all our large cities, and when the germs of pneumonia invade the body, they find not only a soil suitable for propagation, but with a vitality of so little resisting power that the battle between the phagocytes and parasites is but a short one.

Environment.—The increasing migration of the youth of both sexes to the cities is another important factor in the problem. In 1850 the population of the United States numbered twenty-three million people, of which twelve per cent lived in the cities. In 1900 the population numbered seventy-eight million people, of which twenty-six per cent resided in the cities. One-fourth of the people, then, are quartered in cities.

Exchanging the pure fresh air of the country for the smoke-begrimed and less pure air of the city workshops, stores, offices, and tenement-houses, in many of which a ray of sun never enters and where pure air is an unknown quantity, they are compelled to take less oxygen into their lungs, are deprived of outdoor exercise, observe less regular hours, suffer the mental strain of trying to solve the problem of how to keep the wolf away from the home, to say nothing of the dissipations that are engendered by a life in the city, and we have all the conditions that impair digestion and assimilation of food, increase excitability of the nervous system, impair the action of secretion, and weaken the vital resistance of the individual. A trip through the tenement district of any of our large cities, where the sanitary conditions are vile, will convince the most skeptical.

Previous Attacks.—Pneumonia leaves the person peculiarly susceptible to future attacks, and it is not infrequent to find patients having their third, fourth, or fifth attack.

Infectious Diseases.—Certain infectious diseases are very prone to have pneumonia as a complication, notably typhus, typhoid fever, measles, and dysentery.

Exciting Cause.—The old idea that cold, exposure, and the sudden arrest of the secretions was the direct cause of an attack of pneumonia still has a very large following, notwithstanding the general acceptance by the profession that it is due to the micrococcus lanceolatus of Fraenkel. That cold figures very largely as a causal factor can not be gainsaid, and the frequent attacks of pneumonia, following immediately after a sudden chilling of the body and temporary arrest of the cutaneous secretions, causes a retention of excrementitious material in the blood, and which, seeking to be eliminated through the lungs, sets up an irritation sufficient to produce an inflammatory condition. Whether these same excrementitious materials produce a toxin which creates the inflammation; or whether these conditions simply prepare the soil for microbic invasion and afterwards infection,—the experimenter of the future will have to determine.

Bacteriology.—The micrococcus lanceolatus, pneumococcus or diplococcus pneumoniae of Fraenkel and Weichselbaum was first discovered by Sternburg in September, 1880. In December of the same year, Pasteur discovered the same organism, not being aware of a prior discovery; neither one, however, recognized any relation existing between the germ and pneumonia.

Sternburg's discovery resulted from isolating the micrococcus as a result of inoculating rabbits with his own sputum, while Pasteur found the same coccus in the saliva of a child dead of hydrophobia. It was not until April, 1884, that A. Fraenkel came to the conclusion that the organism discovered by Sternburg and Pasteur, and which had come to be known as the coccus of sputum septicemia, was the causal factor of pneumonia, since it was the organism most frequently found in that disease.

In 1886, Fraenkel and Weichselbaum were able to demonstrate the micrococcus as the causal agent in *most cases* of pneumonia. These and other experiments seem to justify the etiologist in naming this germ as the specific cause of lobar pneumonia. We are not to forget, however, that this same organism is found in the saliva of twenty per cent of healthy individuals, and in many other diseases, such as pleurisy, pericarditis, peritonitis, cerebrospinal meningitis, and others.

This organism is a lance-shaped coccus, united in pairs; hence the term diplococcus; and is found in health in the nose, Eustachian tubes, and larynx, and in various diseases besides pneumonia.

Pathology.—The right lung is more frequently involved than the left, and one lobe, or one entire lung, rather than both lungs at the same time. A reference to the following table compiled by Juergensen will show the relative frequency of the parts affected:

Right Lung.....	53.70
Right Upper Lobe.....	12.15
Right Middle Lobe.....	1.77
Right Lower Lobe.....	22.14
Right Whole Lung.....	9.35
Left Lung.....	38.23
Left Upper Lobe.....	6.96
Left Lower Lobe.....	22.73
Left Whole Lung.....	8.54
Both Lungs.....	8.07
Both Lungs, Upper Lobes.....	1.09
Both Lungs, Lower Lobes.....	3.34

The anatomical changes that take place in pneumonia have for years been considered under three heads or stages.

1. The stage of congestion or engorgement.
2. Stage of consolidation or red hepatization.
3. Stage of gray hepatization.

Stage of Engorgement.—In this stage there is hyperemia of the part or parts involved, which increases till there is marked engorgement. At this time the tissues are of a deep-red color, firmer in consistency and heavier than normal lung tissue, and, on making an incision, the cut surfaces will be bathed in a bloody serum; there is still some crepitation on pressure, and the lung will still float. The capillaries are greatly distended, the white corpuscles appear in great numbers, and the alveolar epithelium becomes detached and undergoes granular degeneration. The hyperemia, with its accompanying redness, extends into the bronchi, which at first are dry, but this condition is soon replaced by mucus. In the smaller tubes similar changes to that of the air vesicles take place.

This stage may occupy but a few hours or extend over a couple of days. As a result of this engorgement, there is exuded into the air vesicles and smaller bronchioles a fibrous exudate, in which are found epithelial cells, fibrin and granular matter, thus giving rise to the second stage, or consolidation.

Red Hepatization.—This stage takes its name from the resemblance of the affected parts to the liver. The volume of the organ is increased, the color is purplish or mottled, and frequently there is indentation from the ribs. The tissue is now solid, no air in the cells, no crepitation, and the lung will sink if placed in water. The tissue is friable, and may be easily broken down.

The cut surfaces show a granular material, consisting of fibrinous plugs, alveolar epithelial cells, red corpuscles, and leucocytes which have filled the air vesicles. If a large portion of the lung be involved, the irritation extends to the pulmonary pleura, and this surface is soon covered with a film of fibrous exudate, and the sac may contain a serous effusion. The interlobular tissue contains the same characteristic exudate.

Gray Hepatization.—This is the stage of resolution or diffuse suppuration. The color of the lung tissue, as the name indicates, loses its dark-red color and becomes pale or grayish white. The tissue is more friable and the granular elements less distinct, and, as fatty and granular degeneration takes place, the exudate breaks down, becomes moist, and, on making a section, a turbid, purulent fluid appears. The air vesicles are filled with leukocytes, the fibrin and red corpuscles having disappeared; with this disintegration of the cellular elements, resolution is fully established and the absorbents carry it off.

Where the recuperative powers are feeble, this stage of gray hepatization may remain for several weeks, and if the exudation has been quite extensive, abscesses may form, which may open into a bronchus, or it may become encapsuled, undergoing caseous degeneration.

Changes in Other Organs.—The heart is frequently pale and flabby and contains large, firm clots, especially the right chamber, which can be removed in the shape of a cast. In no other disease is the coagula so firm and tenacious.

Pericarditis occurs in about five per cent of the cases, usually when the left lung is involved or in double pneumonia. Osler found five cases in one hundred autopsies. Endocarditis is more

frequent, sixteen being reported in one hundred cases examined, five of which were of a simple character, while eleven were of the ulcerative type.

Chronic interstitial inflammation and parenchymatous degeneration of the kidneys may result.

The liver and spleen may show parenchymatous degeneration and are slightly enlarged.

Croupous or diphtheritic inflammations are among the very rare complications, and when seen are usually in the form of a thin, flaky exudate.

General Symptoms.—The period of incubation is usually of short duration, not over twenty-four or forty-eight hours, save in old people or delicate subjects, when it may last for three or four days. During this stage there may be catarrhal symptoms, with a short bronchial cough, oppression of the chest, and hurried respiration; headache and general malaise, make up the list. Usually, however, the onset is quite sudden, being ushered in with a chill of *pronounced character*, lasting from thirty to sixty minutes. This may occur while the patient is at his work, or may awaken him in the night. So pronounced is the chill that it is characteristic of this affection, no other acute disease comparing with it; for this reason it is one of the earliest diagnostic symptoms.

In children, a convulsion may replace the chill, while in old people a sense of chilliness may replace the rigor. Febrile reaction follows, the temperature rapidly rising to 104° or 105° within the first twenty-four or forty-eight hours. The skin is hot, dry, and constricted, the face flushed, especially the cheek of the affected side. The eyes are bright, pupils contracted, there is headache, and the patient is quite restless. The urine is scanty and highly colored, and the bowels are constipated, though occasionally diarrhea is seen from the beginning. The tongue is dry and covered with a white, pasty coating; there is loss of appetite, and the patient experiences great thirst.

His position in bed is another characteristic feature, the patient lying upon the affected side; by this means the lung and pleura are held more quiet, and thus the acute pain is lessened.

After three or four days, the patient assumes the dorsal position. A short, dry, hacking cough is one of the early symptoms, which is attended with but little expectoration. The breathing is short and rapid, expiration often being audible and accompanied

by a "grunt;" there is unusual expansion of the chest, and the *alæ nasi* dilate forcibly on inspiration. The pulse is full and bounding, save in the aged and those of feeble vitality. Herpes of the lips occurs more frequently in this than in any other disease.

Special Symptoms.—*Temperature.*—The temperature rises rapidly, reaching 105° or 106° within fifteen or twenty hours. Having reached the maximum height, it runs a uniform course for from five to seven or eight days, there being but from one-half to one degree difference between the evening and the morning temperature. This uniformity of temperature continues to the crisis, which takes place from the fifth to the tenth day, when it rapidly declines, frequently reaching the normal in eight or ten hours, and not infrequently becoming subnormal. In old people, drunkards, and delicate people, the temperature does not run so high, rarely exceeding 103° .

Pain.—Pain is a prominent symptom of most cases, the exception being where but a small portion of the interior portion of the lung is affected, or where the apex is the seat of the disease. The pain is sharp, lancinating, or throbbing in character, and usually in the region of the nipple. A full inspiration increases the pain; hence we find the patient grasping the side as if to prevent the motion of the lung, and the breathing is shallow. With the consolidation of the lung, the pain becomes much less severe, often disappearing entirely.

Respiration.—While the respiration is rapid in all fevers, in pneumonia it is characteristic, dyspnea being a marked feature.

Following the chill, the respiration is short and rapid, ranging from thirty to sixty in the adult, and from fifty to a hundred in the child. As the stage of engorgement passes to that of hepatization the breathing becomes quite labored. When the cough is paroxysmal and when the expectoration is unusually viscid, the breathing is very distressing, the patient being propped up in bed, while he grasps some object to give greater freedom to the expiratory muscles. The face takes on an anxious expression, and the gravity of the case is evident to the merest tyro in medicine.

Cough.—Beginning with the invasion of the disease, a short, dry, hacking cough, attended by more or less pain, suggests a wrong of the respiratory apparatus, and by the third or fourth day it is characteristic, the patient using every effort to suppress

the paroxysmal, frequent cough. In hard drinkers, or in feeble, aged patients, it may be much lighter and in some cases entirely absent.

Expectoration.—The expectoration is often delayed for two or three days, though a white, frothy mucus may be raised the first day. The mucus is foamy or filled with little bubbles, and is readily recognized as coming from the lung. Occasionally a hemorrhage is the first material to appear.

By the second or third day the sputum is characteristic; thick, viscid, and so tenacious that it runs together in the vessel, which may be inverted without discharging it. Occasionally this tenacious, gluey mucus is streaked with blood, though this more often occurs in bronchitis. By the fourth or fifth day the mucus has become opaque, and is intimately mixed with blood, giving it a rusty or orange color, and so characteristic is this sputum as to be pathognomonic.

In low grades of the disease, and sometimes in old people, the mucus may be of a watery character, and of a prune-juice color. The quantity varies—in some it is very scanty, while in others it is very profuse. As resolution takes place, the rusty color gives way to a yellow mucosity.

Physical Signs.—Inspection.—As before remarked, the patient will be found lying upon the affected side if one lung be affected, or on the back if both lungs are involved. The first few hours may not reveal to the eye the changes that are taking place; but, after twenty-four hours, inspection of the chest shows a restricted motion on the side involved, and increased expansion on the well side; and later, when complete consolidation has taken place, the expansive power entirely disappears. The frequency and difficulty of respiration and the dilation of the *alæ nasi* are not to be overlooked.

Mensuration will show an increase in volume on the affected side.

Palpation.—The tactile fremitus is increased over the congested area, while the absence of expansive power is very suggestive.

Percussion.—During the stage of engorgement, but little information will be gained on percussion, and if the inflammation be in the more central part of the lung, and but little of its cir-

cumference be involved, the percussion note will be normal. As the exudate takes place, however, the dullness increases, and in the second stage is complete.

With the beginning of resolution the peculiar dead or flat note begins to disappear, resonance becoming more marked each day, till the exudate entirely disappears and the lung is restored to health.

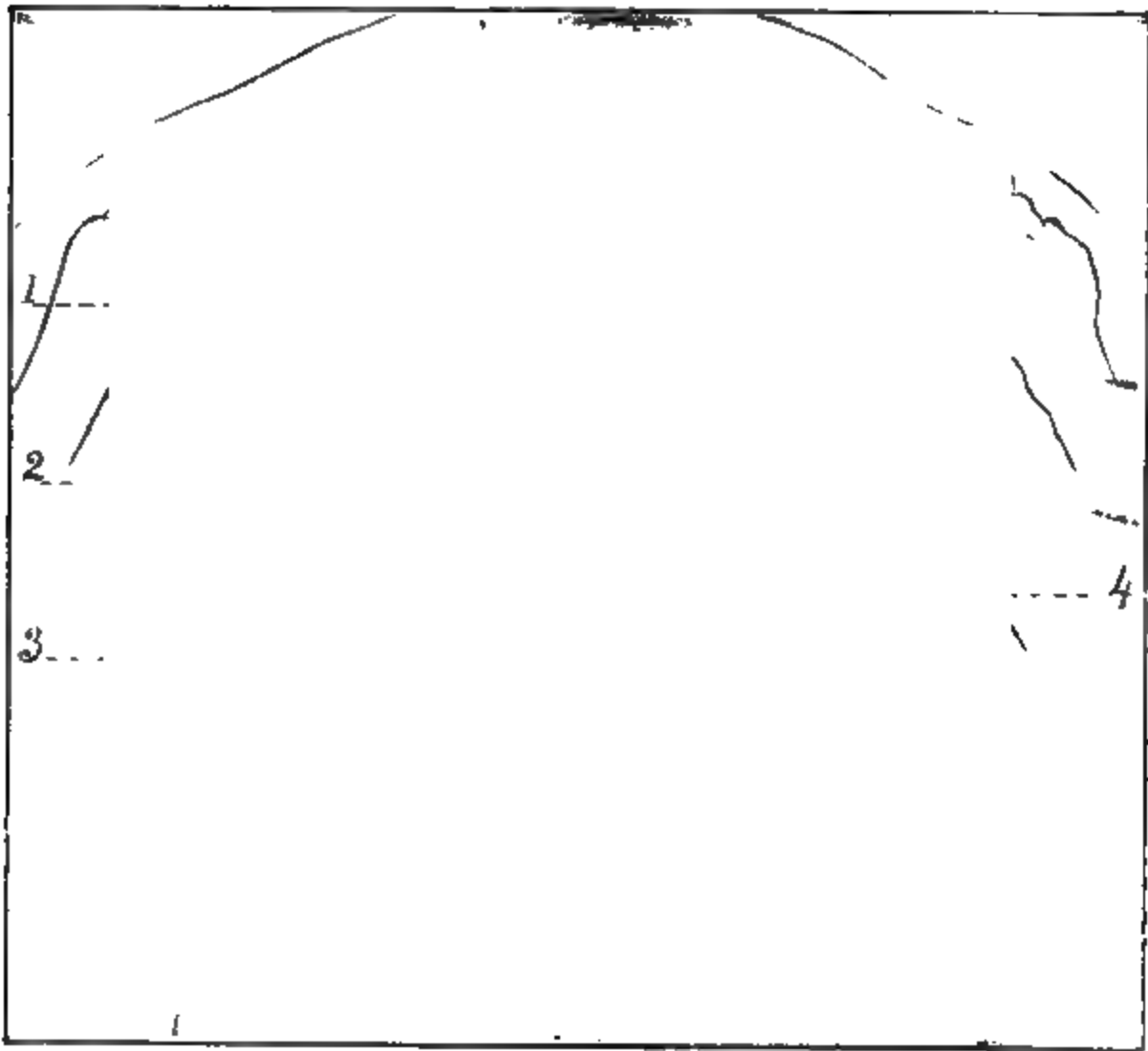


FIGURE 19. LOBAR PNEUMONIA; 1. UNAFFECTED AREA (UPPER LOBE); 2. CONSOLIDATED AREA (MIDDLE LOBE); 3. RESOLVING AREA (LOWER LOBE); 4. HEART IN NORMAL POSITION.—(*Anders.*)

In some cases, restoration is not complete for weeks or months; and in some, never. Percussion gives us valuable information in these cases.

Auscultation.—In the early stage, the rhythmical respiratory murmur is replaced by a dry or sibilant rhonchus, which soon is replaced by the coarse crepitant rhonchus, this latter sound resembling the crackling noise of salt when thrown on the fire, this

crackling becoming finer each day as the air cells and finer bronchi become filled with the exudate. The sounds now are fine, resembling the sound of hair rubbed between the fingers. When consolidation is complete, crepitation ceases, to be resumed as resolution takes place, the crepitant sounds being reversed; viz., the very fine crepitant sounds being followed by the coarser

FIGURE 20. ACUTE PNEUMONIC PHTHISIS, POSTERIOR VIEW; 1. CAVITY; 2 and 3. CONSOLIDATION; 4. INFILTRATION; THE WHITE SPOTS INDICATE RALES.—(*Anders*)

or loud crackling sound, and in time by the musical rhythmical murmur of health.

During the stage of red hepatization, when the crepitant rales disappear, we have tubular breathing, as heard in health over the larger bronchi. The sound of the voice is transmitted through the consolidated lung with peculiar intensity, and is termed bronchophony; and when a peculiar nasal sound is imparted, the term egophony is used.

Complications.—Pleurisy.—The pleura is involved to some extent, in all cases of pneumonia where the surface of the lung is involved, and can hardly be called a complication; but where the pleura is early involved or takes precedence in the inflammatory process, it is termed pleuro-pneumonia. Occasionally we find pneumonia of one lung, and pleurisy on the opposite side. With this complication there is increased difficulty in breathing, the respiration being shallower and the pain more severe.

Bronchitis.—The inflammation often extends to the bronchi, and bronchitis is a frequent complication. Here the breathing becomes more difficult and the cough more harrassing; the sibilant rales, followed by the mucous rhonchus, determine the condition.

Pericarditis.—This is not a very frequent complication, though in children it is found more frequently than in the adult. It occurs more often when the left lung and pleura are involved. The history of rheumatism is of importance in these cases. The symptoms are, increased dyspnea, diminished heart sounds, and a feeble pulse.

Endocarditis.—This occurs more frequently than pericarditis, and like the latter is more apt to occur when the left lung and pleura are involved. If valvular troubles have previously existed, there is a greater tendency to this complication. The symptoms are obscure, even in severe cases, the conditions generally being discovered post-mortem.

Meningitis is a serious complication, though not very frequent. It occurs more frequently in children of an active nervous temperament. It will be recognized in the child by restlessness, rolling of the head, and starting in the sleep.

Gastric Complications.—These are recognized in two conditions,—one of irritation, and the other, atony. In the one, there is nausea and retching and tenderness over the epigastrium; the tongue is narrow and elongated, reddened at tip and edges. With this condition the inflammation is more active and the temperature higher.

Where there is atony, the tongue is full, broad, and heavily coated. The skin is not so dry and harsh, and the temperature does not run so high. Resolution is delayed, and there is a greater tendency to congestion of other organs.

Jaundice is not uncommon; when it occurs, all the symptoms are more intense.

Typhoid Pneumonia.—While pneumonia is a frequent complication of typhoid fever, enteritis seldom occurs as a complication of pneumonia. In the rare case where it occurs the symptoms are as follows:

"A protracted chill; febrile reaction coming up slowly; the pulse frequent, soft, and fluent; heat of the surface not greater than natural; coldness of extremities; bowels easily acted upon or tendency to diarrhea; limpid, frothy urine; dirty coating of the tongue; and especially that dullness and indifference so characteristic of typhoid or typhus diseases. The inflammation in this case is ataxic; there is difficult breathing and cough, with watery expectoration.

"Physical examination gives us rapidly increasing dullness on percussion to a certain degree, at which point it remains, sometimes, during the entire progress of the disease; there is no crepitant rhonchus, and the mucous rhonchus sounds hollow and distinct. This condition is of variable duration, sometimes the disease is slow and protracted for weeks; at other times it is rapidly fatal." (Scudder.)

Recurrence.—There are few acute diseases in which there is a recurrence as often as in pneumonia. Each attack may be more severe, though this is not necessarily so.

Diagnosis.—The diagnosis is usually not difficult. The sudden and marked chill or rigor lasting from thirty to sixty minutes; the high febrile reaction; the anxious expression on the face and the dusky red spot upon the cheek; the quick, shallow respiration; the short, dry, hacking cough; the sharp pain over the affected part; the sharp, crackling, crepitant rhonchus, followed by the fine crepitant rales; the dullness on percussion; the frothy sputum the first twenty-four or forty-eight hours, followed by rusty expectoration,—are symptoms that are so characteristic as to leave but little doubt, not only as to the disease, but also as to the degree and stage of the inflammation.

The doubtful case is found in old people, where the initial chill is either slight or entirely absent, and where the cough is slight or absent, and when the inflammation is deep-seated and but few physical signs are present.

Prognosis.—Although pneumonia is regarded as one of the most fatal of acute diseases, and, according to recent allopathic authorities, is progressively increasing, I am sure that a very large per cent should recover; that the mortality should not be

over from three to five per cent. This may seem to be an extravagant statement to one who has practiced the treatment as advocated by the dominant school, but the record of Eclectic treatment in pneumonia will bear me out in the assertion. If seen early, the inflammatory process can be so modified that the severer types will be seldom seen, and an early convalescence assured.

Treatment.—If there is any one disease more than another that shows the superiority of Specific Medication over the old methods of treatment—and I might also add the present methods that are attended by a mortality of from twenty to forty per cent—it is pneumonia. The experience of the profession, for the last century or more, is that the more active or heroic the medication, the greater the mortality.

The expectant treatment, which is *no medication*, has yielded far better results than the old method of drugging, and while we would prefer that to the old, we believe that there is still a much better way.

Pneumonia is a typical inflammatory disease, and if we have remedies that will overcome these conditions, we certainly have remedies that are curative.

General Management.—Where possible the patient should be placed in a large, sunny, and well-ventilated room. Plenty of fresh air must be admitted, though all draughts of air should be avoided. The temperature should be uniform, and not over 68° or 70°. The patient should have a loose woolen night-dress, and only sufficient covering to keep him comfortable. The care of the bed and secretions must be as scrupulous as in typhoid. Only one attendant should be with the patient.

Diet.—The diet should be liquid and consist of milk in some form or broths, and given at regular intervals. A good table water may be used freely.

Medication.—Wrongs of the circulation occupy the first place in many cases, but not in all. In some, wrongs of the blood itself precede all others; while in another class, wrongs of the nervous system take precedence. Such being the case, conditions have to be met and overcome before we can effect a cure, and it is this prescribing for definite conditions that brings about success.

If we keep well in mind the pathology of the different stages of this disease, we are not apt to become confused or go far

wrong in the treatment. Thus, in the first stage, there is usually an active condition of the circulation; the heart beats rapidly, the pulse being *full, strong, and bounding*; the capillaries become *full* and distended, giving us the stage of engorgement. If we are to relieve this engorged condition, we *must* slow the heart and circulation, and I know of no remedy that will accomplish this end with such happy results as veratrum, if used skillfully. It does not depress and weaken the heart like the coal-tar products, but acts kindly, slows the pulse, reduces the temperature, and relieves the obstructed venous capillaries. Its action is uniform and easily controlled, even in the large dose.

Aconite is the remedy where the heart's action is rapid, but the pulse is small but *hard* and *wiry*. It is generally prescribed in the sthenia of children, while veratrum acts better in the adult. Should the heart be weak, as shown by a small, *feeble* pulse, aconite must not be given, save in the very small dose.

Pilocarpus or *jaborandi* acts kindly, where there is high temperature, great excitement of the nervous system, and a dry, hot skin.

With these remedies as our sedatives, we have the foundation for a successful treatment, for they not only relieve engorgement in the early stage, but materially assist in the removal of the exudates that follow, and, where carefully used, the second and third stages are so modified as to furnish but little need for alarm.

The indication for the remedies that have been so successfully used in pneumonia is as follows:

Veratrum.—One of the characteristic symptoms of the majority of pneumonia patients is a *full, free, bounding* pulse; in other words, there is an excess of heart power. Now, if we have a remedy that can reduce the force and frequency of the pulse, *without reducing* at the same time the vitality or resisting power, we have a remedy for this condition. Experience proves that we have such a remedy in veratrum. Our prescription, then, for this active, sthenic condition, as marked by the *full, bounding* pulse, will be this agent, and we will administer it as follows:

R	Veratrum	℥ss.	
	Sulphate of Morphia.....	gr. i.	
	Aqua	℥iv.	M.

Sig. Teaspoonful every one, two, or three hours as the symptoms indicate.

The morphia used is to counteract the nauseating effects that sometimes follow the use of veratrum.

Jaborandi.—This is the remedy so highly extolled by some Eclectics, where the temperature is high, there is great excitement of the nervous system, and where the *skin* is *hot* and *dry*:

℞ Specific Jaborandi.....ʒi.
Aquaʒiv. M.
Sig. Teaspoonful every hour.

Aconite.—While the average pneumonia patient has a *full, strong, bounding* pulse, there are cases where just the opposite condition exists; the pulse is *small* and *frequent* and shows a defect in the heart's action, *debility*; the heart beats rapidly to make up for want of power. We find this pulse in children and patients of delicate constitution, and frequently in old people. The heart needs a stimulant or tonic; in such cases the *small* dose of aconite slows the pulse and increases the tone of the heart by overcoming irritation and quieting the nervous system. Aconite in the *small* dose is not a depressant. The prescription here will be:

℞ Aconitegtt. v.
Waterʒiv. M.
Sig. Teaspoonful every hour.

Given in this way the heart is not depressed, nor the vitality of the patient impaired. In the place of adding to the load the patient has to carry, we have relieved him of a part of his burden.

These *three* remedies form the foundation upon which we will build a successful treatment.

Bryonia.—This agent has been found of great value in diseases of the chest of an acute nature. When the pulse is hard and vibratile, and when the pain is sharp and lancinating, with flushing of the cheek, and there is a hard, harassing cough, bryonia will be the remedy to give relief. It also favors absorption of the exudate. If the pleura be involved, it is an additional reason for its use. It combines nicely either with aconite or veratrum, and can be dispensed with the sedative, or it may be used separately, alternating each hour with the sedative. It should be given in the small dose, not over five or ten drops in half a glass of water.

Asclepias.—This is another excellent remedy in diseases of

the respiratory apparatus, and occupies an important place in the treatment of pneumonia. It acts upon the sudoriferous glands, overcomes the dryness of the skin, relieves the tight, hard cough, modifies the sharp pain, and hastens absorption. It also takes the *edge* off the *sharp* pulse, adds tone to the heart, and quiets the nervous system. To get the best effects, give from five to ten drops in hot water every one, two, or three hours. It is especially useful in infantile pneumonia with high fever and dry skin.

Ipecac.—Ipecac, if given in small doses, is one of our best remedies in overcoming irritation of the mucous surfaces; and in children, where there is an irritating cough and the child is unable to obtain rest, the small dose, say five to ten drops in half a glass of water, will be found of great value.

Lobelia.—I would hardly know how to treat infantile pneumonia without the small dose of this old but valuable remedy. In those cases where the finer bronchioles become choked with the exudate, and the child's breathing is labored, and there is a mucous rattle, I know of no other agent that can take its place. In the adult, there is labored respiration, a sense of fullness and weight and oppression about the heart, while the pulse is oppressed or small and feeble. There is increased secretion of mucus in the respiratory passages, but the patient seems unable to remove it. In these cases lobelia, five to ten drops, in water four ounces, will give the best results.

If the patient is seen early, few cases will need any other than the above-named remedies, and the mortality will be very low.

Occasional Remedies.—*Macrotys.*—When the patient complains of muscular soreness, or where there is a tendency to rheumatism, macrotys will prove an excellent agent, ten to twenty drops, in water four ounces, a teaspoonful every hour.

Sanguinaria.—This is a good remedy where there is a tickling sensation in the throat, resulting in an almost constant paroxysm of coughing. I like the action of nitrate of sanguinaria here better than that of the tincture and give,

℞ Sanguinaria gr. ¼.

Aqua

Simple Syrup.....aa ʒii. M.

Sig. Teaspoonful every hour.

Phosphorus.—Where the pulse is small, the skin cool, and temperature subnormal, this is a good remedy to start up the

fires and give the patient a chance for his life. Very rusty sputum is also an indication for this agent.

Sticta Pulmonaria.—Where the patient has a hard, racking cough, with pain in the occiput and between the shoulders, we should not forget this remedy; ten to thirty drops, to water four ounces, a teaspoonful every hour.

Complications.—*Gastro-Intestinal*.—In some cases there is great irritation of the stomach and bowels; so much so that neither food nor medicine is retained. The tongue is red at the tip and edges, and it is narrow and elongated; there is nausea and vomiting and retching, tenderness on pressure over the epigastrium, and frequently diarrhea. Respiration is shallow and painful; skin dry, and constricted. Fortunately the remedies to give relief to this irritable condition are also useful for the primary lesion—aconite and ipecac, with a sinapism over the epigastrium. If the nausea persists, bismuth in mint-water will be useful. Small bits of ice may be held in the mouth, thus allaying the thirst and quieting the nausea.

In place of this condition there may be atony; in either case, absorption of food and remedies is prevented. Here the tongue is broad and pallid, with paleness of the mucous membranes, or there may be a heavy, pasty coating upon the tongue. The temperature is not so high as in the former case, nor the cough so continuous or harassing.

Nux Vomica.—If the tongue be broad and pale, with pallidity of the mucous surfaces, five to ten drops of nux, in water four ounces, a teaspoonful every hour, will be good medication.

Podophyllin.—If the tongue be broad and full, with a dirty, yellow coating, and a sense of fullness of the abdomen, and if there is a dirty, yellow, doughy skin, the bowels sluggish, the respiration oppressed, the superficial veins full and prominent, podophyllin will do good service. It may be given in one-half-grain doses every two, three, or four hours, till the bowels open and the tongue cleans, or we may use the second trituration, three to five grains, in the same way.

Antiseptics.—During some epidemics, there seems to be a tendency to sepsis, and the symptoms are of the typhoid type. The principal remedies in these cases are the antiseptics.

Sulphite of Sodium.—Where the tongue is moist, with a nasty,

dirty coating, a saturated solution of sulphite of sodium in tablespoonful doses every three hours, is a most excellent remedy.

Chlorate of Potassium.—Where the tongue has a moist, yellow, pasty coating, with a fetid breath, a saturated solution of potassium chlorate and phosphate of hydrastin, will be the best remedy.

Acids.—If the tongue be dry and grown, with redness of the mucous membranes, then hydrochloric acid, C. P. gtt. x to xx, to water and syrup, aa, two ounces, will replace the alkalies.

Echinacea.—When the tongue is full and of a dusky hue, and the tissues of the same dusky color, echinacea from one to two drams, to water four ounces, a teaspoonful every hour, gives good results.

Baptisia.—The tissues appear as though frozen, are full and dusky; the tongue is full and purplish in character, while the expectoration is dark, thin, and of a prune-juice order; there is diarrhea of an offensive character,—with these conditions, baptisia becomes a prominent agent: ten to thirty drops of the tincture, to water four ounces, a teaspoonful every hour.

Wrongs of the Nervous System.—Irritation of the nervous system, with a tendency to meningitis, will give us the flushed face, bright eyes, and contracted pupils; the patient is restless, uneasy, and wakeful; the temperature is high. To the appropriate sedative we add ten to thirty drops of gelsemium, and give a teaspoonful every hour.

Rhus Tox.—Where there is irritation of the cerebro-spinal centers—as will be shown by the sharp stroke of the pulse, the restless, irritable condition, the sudden starting in the sleep, the contracted and pinched features—*rhus tox.* will be our most valuable remedy; five to ten drops, in water four ounces, to which has been added aconite five drops; a teaspoonful every hour.

Belladonna.—There is not infrequently marked capillary congestion. The pulse is obstructed and feeble, the face is flushed and dusky, the extremities are cool, the eyes dull, and the pupils dilated, where the patient is inclined to doze or sleep most of the time. With these evidences of general congestion, we give belladonna gtt. x, to water four ounces, a teaspoonful every hour.

Quinia.—If periodicity is a marked feature and the tongue is moist, quinia and hydrastin will prove beneficial.

Strychnia.—Where there is a feeble pulse, with tendency to heart-failure, strychnia, one-thirtieth grain every four or five hours, is demanded.

Local Applications.—It will be difficult to convince some of the older practitioners that a pneumonia patient will do as well, if not better, with a light flannel bandage over the chest, than the mush-jacket or the old hop-poultice. I am sure that many patients have been harmed by the improper application of the poultice. Where they are allowed to grow cold, there is great danger of chilling the patient. If they *must* be used, always have *two* poultices made, and while one is on the patient, the other may be in a steamer on the stove, and as soon as one *begins* to get cold, have the hot one at the bedside so that it may immediately be placed upon the chest as the other is removed.

A better plan, however, is to spread a flannel or cotton cloth, with lard and dust emetic powder, over the surface, and, after heating this, envelop the chest; or if but one lung be involved, cover the affected side. Where the skin is very tender, this powder sets up too great an irritation, and we resort to other measures.

Libradol spread upon a cloth, and applied hot, will give good results. It should be renewed night and morning. These latter applications are light, do not oppress the patient, are easily applied, and there is no danger of taking cold while changing them.

BRONCHO-PNEUMONIA.

Synonyms.—Capillary Bronchitis; Lobular Pneumonia; Catarrhal Pneumonia.

Definition.—An inflammation of the terminal bronchi, air-vesicles, and interstitial tissue of a few or many of the lobules.

Etiology.—This is peculiarly a disease of early childhood and old people, though enfeebled vitality and prolonged sickness of any kind predisposes to broncho-pneumonia. In children it is especially apt to follow the infectious diseases that affect the bronchi and are attended by a cough, such as measles, whooping-cough, influenza, diphtheria, and scarlet fever.

Tubercular patients, especially where the lungs are involved, are frequent subjects of this form of pneumonia. Typhoid fever,

small-pox, and diseases of like character, are not infrequently complicated with this disease.

The inhalation of particles of food or broken-down material from the throat, as from diphtheria or tonsillitis, may give rise to inflammation, and is known as inhalation or deglutition pneumonia.

The disease is seen most frequently in the winter and early spring months, when the weather is marked by sudden changes.

Pathology.—The pathological changes are essentially those of bronchitis and of pneumonia, in about eighty per cent of the cases, both lungs being involved.

The pleural cavities usually contain their normal amount of fluid, though their surfaces, pulmonary and parietal, may exhibit inflammatory patches—fibrinous pleurisy.

In most cases, the lung crepitates on handling, and will float when placed in water, though the small mahogany-colored nodules found distributed throughout the lung, when excised, sink in water. The nodules are found in greater numbers in the posterior part of the lower lobes. These nodules vary in size from a pinhead to a pea, and, when pressed, a small amount of blood exudes. These nodules may be so numerous as to resemble a hepatized lung; where these indurated patches are few in number, the intervening lung tissue may be normal, though usually it is congested or edematous.

Surrounding the nodules, emphysematous lung-tissue is not infrequently seen, with occasional collapsed areas—atelectasis.

The bronchi, small and medium-sized, are the seat of catarrhal inflammation, the walls of which are swollen and infiltrated with round cells. The exudate within the bronchi consists of leukocytes and micro-organisms.

Northrup speaks of a mechanical dilatation of the smaller bronchi, which occurs most frequently in the lower lobes.

Symptoms.—*Primary Form.*—Though a much rarer form than the secondary, broncho-pneumonia sometimes begins as an acute primary affection, the symptoms being those of acute bronchitis. The usual prodromal symptoms, malaise, with loss of appetite, precede the initial chill, which is followed by febrile reaction. The temperature is usually between 100° and 103° , though in exceptional cases it may reach 104° or 105° .

A hard, dry cough, with a sense of constriction in the chest,

accompanied by a sharp pain, is a characteristic feature. The respiration is rapid, and in children may reach 60, 70, or even 80 per minute. Dyspnea is quite marked. The pulse varies from 120 to 140 per minute. Expectoration attends the cough after the first twenty-four hours, at first a glairy mucus, frequently tinged with blood, which later becomes muco-purulent in character.

Secondary Form.—This is the form usually seen, and comes on more gradually, the earlier symptoms being those of the preceding bronchitis. Not infrequently, the pneumonia complication is not suspected during life.

The first symptom to call attention to the true nature of the disease is the sudden increase in the respiration, quickened pulse, and cyanotic appearance. The expectoration is muco-purulent in character. The cough is hard and harassing, and is accompanied by pain and constriction of the chest.

Physical Signs.—In the primary form, the sibilant and mucous rales are the most prominent signs, the subcrepitant, appearing as the disease progresses and the areas of the vesicular changes increase. In the secondary form, the subcrepitant fine, moist rales are usually present.

Palpation usually reveals local areas of vocal fremitus.

Percussion reveals areas of dullness, where much consolidation exists, but where deep-seated and confined to small spots, is negative.

Complications.—Cerebral complication is not a very rare occurrence, the child becoming restless, the face is flushed, and the head is rolled from side to side; delirium may ensue, while a convulsion is not unusual.

Pleurisy may occur, and tuberculosis is not uncommon. Gangrene and abscess of the lung is a more rare sequela.

Diagnosis.—The diagnosis is readily made as a general rule. The persistent bronchitis with sudden rise of temperature, the dyspnea, hurried respiration, and the rapid pulse, together with the physical signs, are sufficient to determine the character of the disease.

Prognosis.—The prognosis is favorable except in feeble, delicate babies, and in very old people.

Treatment.—The treatment is similar to that of bronchitis or lobar pneumonia. The specific remedies being given for specific conditions.

Aconite.—Where there is fever, with small, frequent pulse, there is no better remedy than aconite. This may be combined with any one of a half-dozen remedies that are frequently called for.

Rhus Tox.—Where there is restlessness and the child is unable to sleep, the pulse quick and sharp, rhus goes nicely with the sedative aconite. Where the smaller tubes are choked up, and oppression is a marked feature, lobelia is the remedy par excellence.

Ipecac.—We sometimes meet a case where there is marked irritation. The cough is hacking and persistent; the tongue is red and pointed; the pulse is quick and hard; the child is cross and peevish. Here ipecac alone, or combined with the sedative, is sure to give good results.

Tartar Emetic.—Where the cough is loose, and the bronchioles are choked with mucus, there are few, if any, remedies that can take the place of tartar emetic. It was a most effective remedy with my father, who used it for over forty years with the best results. Take about one-tenth of a grain of the crude drug to a half a glass of water; teaspoonful every hour. If nausea or vomiting follow, add more water.

CHRONIC INTERSTITIAL PNEUMONIA.

Synonyms.—Cirrhosis of the Lungs; Fibroid Pneumonia; Fibroid Induration.

Definition.—A chronic inflammation of the lungs, in which the normal air-cells are replaced by fibrous or connective tissue, followed by induration and atrophy of the lung.

Etiology.—It is not definitely known why fibroid changes take place in normal tissue following inflammatory conditions. The disease is nearly always secondary, the plastic exudate accompanying the primary lesion becoming organized into fibrous tissue in place of being removed by the absorbents. It may follow several pulmonary affections; thus, in lobar pneumonia, where

resolution is long delayed, the exudate fills the air-cells, becomes organized, and the parenchyma of the lung is changed into fibrous or connective tissue.

Broncho-pneumonia often precedes the disease, while atelectasis and chronic bronchitis are not infrequently followed by cirrhosis of the lung.

Pleurisy.—Chronic pleurisy may be the forerunner of the lesion, the process of tissue formation extending into the lung from the thickened pleural membrane.

As a primary cause may be mentioned long-continued inhalation of different kinds of dust; thus we have cirrhosis or phthisis from the inhalation of dust in the stoneyard, or from workers in iron, brass, or coal, flour-mills, etc.

Pathology.—The disease is nearly always confined to one lung, though, in very rare cases, both lungs may be involved, while localized areas are the rule.

The affected lung becomes atrophied, and, in extreme cases, may be no larger than the closed hand, Anders recording a case where the measurements were only three by four inches. As a result of the shrinkage of lung-tissue, the heart, especially the right side, undergoes hypertrophy. The indurated lung presents a rough or nodular surface, is heavy, dense, tough, and resisting on section.

A cut surface shows the tissue dry and glistening and of varied appearance, according to the character of the irritant. The blood-vessels are atrophied, and, in some cases, show but a trace of their character. The alveolar structure in extreme cases is replaced by fibrous tissue. When tuberculosis exists, cavities of varying size and number are found.

The fellow lung generally undergoes compensatory emphysema. The pleura is generally very much thickened, and adhesions more or less extensive between its free surfaces are found, and not infrequently between the pleura and pericardium.

Symptoms.—When the disease begins as an acute pneumonia, there is nothing in the earlier stages to suggest its fibroid character. The usual time for convalescence, from seven to ten days, having passed, and the dyspnea becoming a chief symptom, and the cough persistent or paroxysmal, the true nature of the disease should be suspected.

As it ordinarily begins, cough and dyspnea are among the

first prominent symptoms. On slight exertion, as climbing stairs or rapid walking, the breathing becomes labored and hurried and the cough distressing. The patient gradually loses flesh and strength, and the common verdict is consumption. When the bronchi become dilated, the characteristic symptoms of bronchiectasis are present.

There is no fever; in fact, a subnormal temperature is quite common.

Physical Signs.—Inspection shows a retraction of the affected side, an obliteration of the intercostal spaces due to the ribs closing the opening, and an immobility of the affected side made prominent by mensuration. The heart will be inclined to the affected side. The chest wall is prominent on the sound side, due to compensatory emphysema.

Percussion.—Percussion shows a marked difference in the two sides,—dullness or flatness on the affected side, with a tympanic note where a cavity exists, or due to a dilated bronchus; on the opposite side there is hyper-resonance.

Auscultation.—Various sounds are revealed by auscultation. Where cavities exist, the cavernous or amphoric sound will be heard, otherwise the respiratory sound will be feeble and distant. Bronchial breathing is the rule.

Diagnosis.—The diagnosis is not readily made early in the disease, but as retraction of the affected side becomes prominent and the physical signs already noted are present, the diagnosis becomes easy.

Prognosis.—The disease is not curable, though life may be prolonged for years. Recurring bronchitis is apt to accompany the disease, and acute pneumonia of the opposite lung may terminate the life. Rarely, death results from failure of the right heart.

Treatment.—The treatment consists in securing a better nutrition and building up the general health; good, nutritious food, an outdoor life in a suitable climate, one where there is a maximum amount of sunshine, moderate altitude, and where the climate is dry.

The medicinal treatment will be symptomatic, selecting remedies for relief of cough and such other conditions as may arise.

PULMONARY HEMORRHAGE.

Synonyms.—Hemoptysis; Broncho-pulmonary Hemorrhage; Bronchorrhagia; Pneumorrhagia.

Definition.—An expectoration of blood, due to hemorrhage from the mucous membrane of the bronchi, trachea, or larynx, and more rarely from erosion or rupture of capillaries in lung cavities or parenchymatous tissue.

Bronchorrhagia.—When the hemorrhage is from the bronchial tubes, the term *bronchorrhagia* should be used, while an escape of blood into the air-cells and interstitial tissue is known as *pneumorrhagia*.

Etiology.—Although hemoptysis is not necessarily a serious condition, occasionally occurring in young persons of seemingly good health, it is usually one of the early symptoms of pulmonary tuberculosis, and should suggest to the physician a thorough examination of his patient.

The hemorrhage may result from congestion of the lungs, due either to pulmonary lesions or from cardiac derangements, especially mitral affections. In capillary bronchitis, not infrequently the distended capillaries give way, and hemorrhage results. Broncho-pneumonia, especially when it is the forerunner of tuberculosis, may also be a cause; severe congestion of the bronchi or ulceration of the larynx, trachea, and bronchi may also give rise to it by erosion of some of the arterial twigs. It may accompany malignant affections, infectious fevers, scurvy, purpura hemorrhagica, hemophilia, and other lesions. Cancer of the lung, gangrene, and abscess must be regarded as causal factors.

Pulmonary apoplexy, or an escape of blood into the air-cells and interstitial tissue, with or without laceration of the parenchyma, may be diffuse or circumscribed. It may be due to penetrating wounds or ruptures of a thoracic aneurism.

Vicarious hemoptysis is most likely an early symptom of tuberculosis rather than a substitute for the menstrual flow.

Pathology.—There is, in most cases, rupture of the capillaries of the bronchial mucous membranes, which at first are swollen and red, but soon become very pale. If tubercular cavities are formed, a ruptured aneurism is sometimes seen, or large blood-vessels eroded by ulceration. If pulmonary apoplexy has existed,

the parenchyma may be lacerated; otherwise, the air-cells and interstitial tissue are infiltrated with blood, which gives them a reddish-brown cast.

Symptoms.—Usually the hemorrhage comes on suddenly, generally after some severe exertion, or undue excitement from coughing, or great vocal effort; while at other times it comes on when least expected, as during sleep. One of my cases invariably had his hemorrhage after going to sleep, though during the day his labor was quite severe.

The first evidence of the hemorrhage is a welling up in the mouth of a warm, salty fluid. The quantity varies greatly, though always appearing to the patient much larger than it really is. It may be that a mouthful may be coughed up every few minutes for an hour or more, then cease for several days or weeks. Again, an occasional mouthful will be expectorated for several days in succession. Where there is a rupture of an aneurism there may be an alarming gush of blood that proves rapidly fatal. One such case occurred in my practice about ten years ago, when a child, suffering from pulmonary tuberculosis, suddenly startled the mother by a frightful gush of blood, and died within five minutes.

Where the hemorrhage is profuse and prolonged, there is usually more or less dyspnea, the patient assuming a distressed appearance and soon becoming anemic. The blood is usually bright red and frothy, containing air-bubbles, though where the blood wells up in the mouth without coughing, the patient is apt to swallow more or less of it, and when this is spit up or vomited it will be dark and clotted.

Diagnosis.—This consists in determining the source of the hemorrhage. That from the lungs and smaller tubes is bright red and frothy. From the posterior nares and pharynx, the expectoration is *streaked* with blood and is airless. From the stomach, the blood is dark and clotted.

Prognosis.—Although hemoptysis usually signifies tuberculosis, it is not necessarily of this character, and the patient may live for years, finally dying of other lesions. I have in mind a lady who, thirty-five years ago, had several hemorrhages, and of whom it was said she would die early of consumption, who is still living, and has two grown daughters.

While alarm is usually felt by the patient, immediately fatal

results very seldom occur. I have known of only one such case in twenty-five years of practice. The prognosis, then, as to life, is generally favorable, save from the rupture of an aneurism or erosion of large branches of the pulmonary artery.

Treatment.—The patient should be placed in the recumbent position, and his fears allayed as to the results of his attack. All excitement is to be avoided and the patient encouraged as to the outcome. Small bits of ice may be swallowed, and cold drinks encouraged. Gallic acid in five to ten grain doses may be given every thirty or sixty minutes, or a mixture of oil of cinnamon and equal parts of oil of erigeron may be given, five to ten gtt. on sugar, every twenty, thirty, or sixty minutes.

Should the hemorrhage be active, with a full, strong, bounding pulse, add tincture of *veratrum* 3ss to water four ounces, and give a teaspoonful every half hour until an impression is made upon the heart, when the remedy should be given every one or two hours.

If the hemorrhage is passive in character, *carbo. veg.* will be a good remedy. Dr. Scudder placed great reliance upon this agent, and, from its use in other passive hemorrhages, I would advise its use. Of the first trituration, give two or three grains every hour. *Mangifera indica* is used where the hemorrhage is passive in character. Dose, three to five drops in water, every one, two, or three hours.

Lycopus Virginicus is a favorite remedy with Eclectics, and may be given as an infusion or the spec. tincture. Where the hemorrhage is due to cardiac lesions, *cactus*, *digitalis*, and like remedies will be given. One must not forget *ippecac* in these cases. It may be given to arrest hemorrhage, but is especially useful during the interim of attacks. The powder in grain doses or the spec. tincture may be given.

Of the domestic remedies, salt and alum should not be overlooked. Following an attack of hemorrhage, the patient should be kept quiet and in the recumbent position for a few days, especially when the hemorrhage has been severe, and remedies given to counteract the loss of tone due to the hemorrhage.

The administration of iron, the bitter tonics, and a nutritious and easily digested food will be good treatment. The patient, as he gains strength, should take light exercise and be much in the

open air. To allay fear of a future hemorrhage, it is well to provide the patient with a few ten-grain gallic-acid powders, with instruction to take one at the first symptom of an attack.

PULMONARY ATELECTASIS.

Synonyms.—Apneumatosi; Collapse of the Lung.

Definition.—A collapse of the air-vesicles of the whole or part of a lung, and which may be either congenital or acquired.

Etiology.—*Congenital.*—This form is usually due to causes that prevent a prompt and complete establishment of the function of respiration at birth, rather than disease of the pulmonary organs. Thus a protracted labor, a compression of the cord, or a placental separation, a premature birth, or a plugging of the bronchioles by mucous or liquor amnii, where the child draws into the larynx these secretions during an inspiratory effort before the mouth has cleared the maternal outlet, may give rise to atelectasis.

When acquired, it is always a secondary affection, and is usually due to *obstruction* or compression.

Cases due to obstruction are those preceded by measles, whooping-cough, diphtheria, influenza, bronchitis, or broncho-pneumonia; the bronchioles becoming filled with a viscid mucus or muco-pus, the air fails to enter the vesicles, and as soon as the air already present escapes, or is absorbed, collapse takes place.

When due to compression, it is from pleural or pericardial effusions, anasarca, cardiac hypertrophy, or abnormal growths. Conditions weakening the respiratory functions also favor atelectasis; thus paralysis of the pneumogastric nerve, enfeebled vitality, as in rickets, poor chest development, feeble inspiratory muscles, and when the environment tends to lower vital force.

Pathology.—The collapse may involve quite a large area, diffuse atelectasis, or it may be confined to small patches, lobular atelectasis, the former being more marked when congenital. The affected portions are airless, do not crepitate, and sink when placed in water. They are slightly depressed from the general surface of the lung, are dense, and of a dark bluish or purplish color; when cut, a dark liquid may be pressed from their surface.

If the disease is recent, the collapsed portions, after death, may be inflated through the bronchus; but if of long standing, the vessel is totally destroyed. The pleura usually remains normal.

Symptoms.—The symptoms are chiefly those of imperfect breathing and defective aeration of the blood, the severity of which depends upon the rapidity of development and amount of lung tissue involved. In congenital cases, the child comes into the world more or less asphyxiated, the respiration is labored, and the child is more or less cyanotic. It appears feeble, sleeps most of the time, nurses with difficulty, or not at all, and has a feeble cry, or moans in its sleep. The surface is cool; the temperature normal, or subnormal. Muscular twitching may be the forerunner of convulsions and death.

In acquired cases, the primary lesion may so overshadow the atelectatic condition as to be entirely overlooked, especially when but few vesicles are involved. If preceded by bronchitis or broncho-pneumonia, which is generally the case, and if the lesion be extensive, there will be a sudden aggravation of all the symptoms. The breathing becomes very rapid, is shallow and arrhythmic. The patient is restless, the nose, ears, and finger-tips become blue, the extremities are cold, and the temperature is often subnormal.

The physical signs depend upon the extent of the collapsed tissue; thus, if the patches are small and involve both lungs, the signs are negative, while if large patches are involved, the physical signs are those of a consolidated lung.

Diagnosis.—In the congenital form, where marked enough to give rise to characteristic symptoms, the diagnosis is comparatively easy. The acquired form, however, is often quite difficult, associated as it is with capillary bronchitis, catarrhal pneumonia, and lobar pneumonia.

The sudden appearance of grave symptoms in bronchitis—such as quick, shallow breathing, rapid pulse, cyanotic discoloration, with fall of temperature—is the most important diagnostic feature. The absence of fever would be important in distinguishing it from pneumonia.

Prognosis.—If congenital, and the child be feeble or premature, or the fetal circulatory openings remain unclosed, the prognosis is unfavorable; if, however, the lesion is slight and restorative measures are early used, the prospects are more hopeful.

In acquired atelectasis, the prognosis is usually grave, though

not necessarily fatal. When the result of whooping-cough or severe broncho-pneumonia, there is usually a fatal termination.

Treatment.—In infants, the air-passages should be cleared, and, where possible, artificial respiration should be practiced, and the child prevented from remaining too quiet. Its sleep should be disturbed at frequent intervals, and crying and coughing provoked, thus securing forced inspiration. In premature births, the incubator has been suggested as a possible means in prolonging life until nature can carry on the vital processes unaided by artificial heat.

In the acquired form, in addition to the measure used for the primary lesion, capillary bronchitis, lobar pneumonia, whooping-cough, etc., the patient should be instructed to change his position frequently, to avoid lying on the back for more than a few minutes at a time, and to practice full inspiration at frequent intervals. In extreme cases, inhalation of oxygen is to be advised.

PULMONARY EMPHYSEMA.

Definition.—A dilatation of the air-vesicles or a rupture of the vesicles, allowing the air to escape into the connective tissue. The forms of emphysema are: Hypertrophic or large-lunged emphysema, atrophic or small-lunged emphysema, and compensating emphysema.

Etiology.—While it is true that, in rare cases, emphysema has occurred where there has been no apparent cause other than a feeble condition of the lung tissue, the strain of normal respiration being too great for the vesicles, the common and almost invariable cause is the result of severe straining due to disease of the respiratory apparatus, or to the physical exertion necessarily used in certain lines of work. Thus the blowing of wind instruments, or the strain upon the lung as used by glass-blowers.

The most frequent cause is the violent strain attending the paroxysm of coughing in bronchitis, whooping-cough, or asthma. Although found in all ages, it occurs more frequently after middle life, and more frequently in males than females, the greater exposure among the former readily accounting for the difference in sex.

Pathology.—The characteristic change in the lungs is the loss of its elasticity from over-distention of the air-vesicles, and

consequent weakening of the elastic tissue of the alveolar septa. As a result, the lungs are of undue size, being greatly distended, and do not collapse when the chest is opened. The apices project above the clavicles, while the diaphragm is displaced downwards. The voluminous lungs crowd the thorax, giving it the characteristic barrel-shaped thorax.

In color, the lungs are gray, being almost bloodless, though they may be streaked with pigment. To the touch they are soft, downy, and may pit on pressure. They do not crepitate, and when placed in water float higher than the normal lungs. The walls of the alveoli, from pressure, become very much distended and lose their elasticity. Often the septa are destroyed, causing the coalescence of several cells.

The bronchial mucous membrane shows chronic inflammation, and is frequently bathed in muco-pus. The right heart is generally hypertrophied, due to obstruction of the pulmonary circulation.

Where there are pathological changes in a portion of, or in an entire lung, such as tuberculosis, adhesion pleurisy, and in lobar pneumonia, the other lung may become emphysematous from the increased work thrown upon it, and is known as compensating emphysema.

In elderly people, atrophy of the lung sometimes occurs, the alveolar walls and septa completely atrophying; there is a coalition of air-cells, which gives rise to large air-sacs, though the lung itself is much smaller than in health. This is known as senile emphysema.

Symptoms.—There are no characteristic symptoms in the early stages, the disease coming on slowly and insidiously, the only symptoms being those of the primary disease, bronchitis, asthma, or whooping-cough.

The first notable symptom is dyspnea, which occurs often after slight exertion, such as going upstairs or performing the daily duties more hurriedly than usual. A hearty meal may be attended by shortness of breath.

As the disease progresses, the dyspnea increases; at first the most marked obstruction is in expiration; but later, as in asthma, both inspiration and expiration seem equally labored, and are attended by more or less wheezing.

Cyanosis.—As the disease progresses and the right ventricle

becomes involved, the patient takes on a cyanotic appearance. At first the lips and fingers become blue, but as compensation gives way, or when the dyspnea is severe, the face becomes puffy and very blue.

Cough.—This is due to the bronchitis, that usually precedes and accompanies the emphysema, being worse in the fall and winter months. Expectoration varies in quantity and consistency, and corresponds to the type of bronchial inflammation. The general health naturally suffers, the patient losing flesh and strength. The temperature is normal or subnormal, while the pulse is feeble, though not much more frequent, save after exertion.

The patient is slightly stooped, and becomes cachectic, owing to cardiac disturbances with congestion of the viscera; there is edema of the feet, though generally dropsy is rare.

Physical Signs.—Inspection reveals the characteristic "barrel-shaped chest," the thorax being rounder than when normal, the antero-posterior diameter being equal and sometimes greater than the transverse. The sternum, scapulæ, and clavicles are prominent. The shoulders are drawn forward, and the patient appears stooped. The interspaces of the ribs are widened on inspiration and expiration, and the chest is raised and lowered as though a solid cage, rather than expanded. The respiratory muscles are prominent.

The apex beat disappears, and epigastric pulsation is noticed. In the advanced state the veins of the neck are distended and pulsate.

Palpation reveals a diminished tactile fremitus, a feeble apex beat, which finally disappears, a distinct systolic shock over the ensiform cartilage, due to changes of the right heart, and a marked epigastric pulsation.

Percussion gives a hyper-resonant or tympanitic sound, the usual cardiac dullness disappearing, owing to distention of the lungs; the normal dullness over liver and spleen being much lower, owing to downward displacement.

Auscultation.—The vesicular respiratory murmur is lost, inspiration is short, while respiration is prolonged. When bronchitis is present, the rales peculiar to that affection are noticed. There is a pronounced accentuation of the pulmonary second sound.

Diagnosis.—The diagnosis is comparatively easy, and scarcely can be taken for any other disease. The characteristic "barrel-shaped chest," the absence of the apex beat, the epigastric pulsation, the hyper-resonance of the chest, the dyspnea and cyanotic appearance, are conclusive evidence of emphysema.

Prognosis.—While the patient may live for years, if too great physical exertion is not used, the prognosis is unfavorable, the disease being progressive, finally terminating fatally.

Treatment.—Where possible, the patient should be removed to a dry, equable climate. Any obstruction of the nasal cavities or pharynx by polypi, adenoids, etc., should be removed. The diet should be carefully selected, sugar and starchy foods restricted, and alcoholic beverages prohibited. Such remedies as bryonia, ipecac, lobelia, sticta pul., tartar emetic, and sanguinaria will be useful in relieving the bronchitis.

Cactus, strophanthus, cretagus, digitalis, and other cardiac remedies will be used in the latter stages. Laxatives and diuretics should be used as may be indicated.

PULMONARY ABSCESS.

Synonyms.—Abscess of the Lungs; Suppurative Pneumonitis.

Definition.—A collection of pus in the lung, accompanied by degeneration of tissue.

Etiology.—Abscess of the lung is due to septic infection, following inflammation. It may follow lobar or lobular pneumonia. It is prone to follow aspiration or deglutition pneumonia, where septic conditions of nose and throat exist. Chronic tuberculosis is also accompanied frequently by abscess of the lung.

Embolic or metastatic abscesses are usually multiple, and are due to septic material carried to the lung through the circulation, as from malignant endocarditis, pyemia, pyonephrosis, and like conditions.

They may be due to perforations from without, and the lodgment of foreign bodies, such as bullets, this being common during the war. It may also be caused by abscesses of other parts, as of the liver, spleen, or to carcinoma.

Pathology.—The abscess may involve one or more lobules or engage almost an entire lobe. The favorite location is the lower lobes, and the right more frequently than the left. They are generally situated at the anterior portion of the lung, and when in contact with the pleura give rise to purulent pleurisy by direct infection. When the abscesses are small, they may be scattered throughout the entire lung.

Symptoms.—The symptoms are not characteristic. The fever is of a septic type, with chill and night-sweats. Cavity signs are usually noted. There is cough, with expectoration of fetid pus, in which shreds of broken-down lung-tissue may be seen. The symptoms of the primary disease should also be taken into consideration.

Prognosis.—The prognosis should be guarded. Where the previous health has been good and the environments are first-class, the outlook is hopeful, especially when following acute diseases. The chronic form is less favorable.

Treatment.—The treatment will be antiseptic and reconstructive. Calcium sulphide should be given four times a day. Echinacea may be employed to correct septic processes. Iron, quinia, and strychnia as a reconstructive, may be of much benefit.

The patient should reside in a climate where he may be much in the open air and sunshine, good, nutritious, and easily digested food furnished, and the secreting organs kept in good condition.

GANGRENE OF THE LUNG.

Definition.—A Putrefactive Necrosis of the Lung, either circumscribed or diffuse.

Etiology.—Gangrene of the lung can only occur where the organ has previously been weakened, hence is always a secondary affection. Putrefactive bacteria thrive in the necrotic soil, but whether the cause or the result of the necrosis is a mooted question. It may follow lobar pneumonia, aspiration-pneumonia, broncho-pneumonia, fetid bronchitis, thrombosis of the pulmonary artery, rupture of a bronchus, from an ulcerated or cancerous esophagus, from pressure due to tumors or thoracic aneurism, and from sepsis due to protracted adynamic fevers.

Pathology.—In the diffuse, when due to lobar pneumonia or the plugging of a large branch of the pulmonary artery, a large part of the lung becomes a dark, greenish brown, or a black, fetid, pultaceous mass, from the center of which softening rapidly proceeds, forming an irregular cavity, containing a foul-smelling, disgusting, greenish fluid.

In the circumscribed form, the disease may involve one or both lungs, usually selecting the dependent portions, and the right more often than the left. The part affected assumes a dark-brown or greenish hue, becomes soft, and early assumes a fetid purplish mass; necrosis beginning in the center, a cavity soon forms. If located near the pleura, putrefaction may occur, giving rise to pyopneumothorax. A bronchitis is always an accompanying lesion, the bronchi containing an offensive and often putrid mucus.

Not infrequently there is found in connection with this lesion, abscess of the brain, liver, and spleen.

Symptoms.—In addition to the symptoms of the primary disease, the cough becomes more pronounced, and is attended by profuse expectoration of a peculiarly offensive character. When allowed to stand, the expectorated material separates into three layers; the upper, a yellowish, turbid brown froth; the middle layer, a clear watery fluid; and the bottom layer, the heavier material, blood, pus, and shreds of lung tissue. The microscope reveals putrefactive bacteria, pus, elastic tissue, fat, crystals, and granular material.

The respiration is slightly increased in frequency, and the breath is offensive. Where erosion of the blood-vessels occurs, hemorrhages take place, sometimes of an alarming character.

There is some fever present in all cases; the patient loses flesh and strength, becomes anemic, chills and night-sweats follow, and the evidence of sepsis is pronounced. There is dullness on percussion in the earlier stages, followed by the sign of cavity formation in later stages.

Diagnosis.—The intense fetor of sputum and breath, the character of the expectoration, the septic fever, and great emaciation, are symptoms that can hardly mislead one in naming the disease.

Prognosis.—Though not necessarily fatal, the disease is always grave. Where the former health of the patient has been good and there is no tubercular taint, and the patient is young or in middle life, recovery will occasionally take place.

Treatment.—The treatment is largely antiseptic, and the Eclectic materia medica is rich in antiseptics. First in importance stands echinacea. This should be given every one or two hours, two drams, to water four ounces, a teaspoonful at each dose. Baptisia, sodium sulphite, hydrochloric acid, and potassium chlorate, with hydrastis, will each have their special indications for use. Eucalyptus used with an atomizer will be found useful as a local remedy. The appetite should be encouraged by nux vomica, hydrastis, chionanthus, etc. The diet should be nourishing, easily digested, and given at frequent intervals. Drainage by surgical means will have to be considered in some cases.

PULMONARY EDEMA.

Synonym.—Edema of the Lungs.

Definition.—A transudation of serum into the air-vessels, and often into the bronchi and interstitial tissue of the lungs.

Etiology.—The edema may be general or local, according to the causes giving rise to this condition.

General edema depends upon active or passive hyperemia, more frequently the latter condition. It may also be caused by feeble heart-action due to dilatation, degeneration, or to pericarditis. Hydremia resulting from hepatic cirrhosis, chronic nephritis, cachexia, or profound anemia, may also be responsible for pulmonary edema.

Pathology.—The lung is heavy, though when placed in water it floats. It pits on pressure, and, when incised, exudes a blood-tinged serum. The edema is most marked at the base and dependent portions of the lung.

Symptoms.—In addition to the symptoms of the disease giving rise to the edema, there will be rapid respiration, marked dyspnea, cough attended by expectoration of frothy, bloodstained, serous material. Cyanosis is often very pronounced.

Percussion reveals marked dullness, especially over the dependent portion of the lungs.

Auscultation gives rales of varying character. General dropsy may follow.

Prognosis.—This is always a grave disease, though, when the causes can be removed, a cure occasionally results.

Treatment.—The treatment is largely directed to the primary disease. Such remedies as apocynum, strophanthus, convallaria, and kindred remedies will afford some relief.

The bowels should be kept open, the secretion of the kidneys maintained, though not overstimulated, and such remedies employed as the case may call for from day to day.

V. DISEASES OF THE PLEURA.

PLEURISY.

Synonym.—Pleuritis.

Definition.—An inflammation, either local or general, of the pleural membrane.

Varieties.—Pleurisy has been classified according to its etiological, pathological, and clinical phases, thus: Etiologically, into primary and secondary, tubercular, carcinomatous, septic, traumatic, etc.; pathologically, into circumscribed and diffuse, dry, plastic, or fibrinous, serofibrinous, purulent, and hemorrhagic; clinically, into acute and chronic.

ACUTE PLASTIC PLEURISY.

Synonyms.—Dry Pleurisy; Fibrinous Pleurisy.

Etiology.—This form may be either primary or secondary. The former is where the inflammation occurs as an independent affection in a person previously healthy. It does not occur as frequently as was formerly diagnosed, many cases, no doubt, being due to a rheumatic or tuberculous constitution.

Although various micro-organisms are found in all forms of pleurisy, notably the bacillus of tuberculosis, the streptococcus pyogenes, the staphylococcus, and the micrococcus lanceolatus, no specific germ has been found as a causal agent. Associated with the above bacilli, have rarely been found the colon bacillus, the proteus vulgaris, Friedlander's bacillus, anthrax bacillus, influenza bacillus, and others.

The most common etiological factor is contracting cold, either by sudden atmospheric changes, or exposure in damp cold weather, or sudden cooling after severe exercise. Mechanical in-

juries occupy a prominent place as causal agents. The winter and spring months serve as an important factor in producing the disease, owing, no doubt, to sudden atmospheric changes. The disease occurs more frequently among men than women, owing to greater exposure of the former. The tubercular and rheumatic taint must also figure as having some bearing in these cases.

The second form is due to an extension, either acute or chronic, of inflammatory conditions of the lung or neighboring parts. Thus it frequently accompanies croupous pneumonia, and is often present in broncho-pneumonia, and is not a rare complication in hemorrhagic infarct, abscess, and gangrene of the lung, and cancerous conditions. It is nearly always present at some period in pulmonary tuberculosis, and in not a few cases is the first symptom of that dread disease.

It may also result from hepatitis, or cardiac inflammations.

Pathology.—Within twenty-four hours the inflamed membrane becomes reddened, congested, and deeply injected, showing many minute ecchymotic spots. The membrane, at first dry, loses its glossy appearance and becomes dull and lusterless, and soon is covered with a fibrinous exudate of a yellowish or reddish-gray color. When the exudate is profuse, it presents a shaggy appearance, due to the friction of the pleural surfaces. This exudate is composed of fibrin, leukocytes, blood corpuscles, and serum in small quantity.

While the inflammation is active and the exudate is profuse, adhesions of the pleura take place, owing to the presence in the exudate of embryonic round cells which develop blood-vessels and connective tissue. If the inflammation is of a mild character, the exudate undergoes fatty degeneration, and is absorbed.

Symptoms.—The symptoms of fibrinous pleurisy exhibit a wide range of symptoms. In one case a stitch in the side is the only reminder of the disease, while in another the pain is of an excruciating character and the prostration so great as to speedily terminate in death, and between these extremes are found every grade of symptoms.

When the disease is of the primary form, it is usually ushered in with a chill or chilly sensations followed by febrile reaction, though generally not of a very severe type, the temperature ranging from 101° to 103° , and in rare cases going to 104° or 105° .

The pulse is small and frequent, from 100 to 120. The se-

cretions are all more or less arrested, the tongue being more or less coated, the skin dry, the urine scanty and high-colored, and the bowels constipated.

Of the local symptoms, the patient complains of a sharp, lancinating pain in the affected side, usually in the region of the nipple. The pain is increased if the patient attempts to take a full inspiration, or if the affected side is moved. As a result, we find the breathing shallow or jerking, and principally abdominal. For the same reason the patient lies on the affected side, that the membrane may be held quiet.

A short, dry, hacking cough adds to the patient's suffering. With the appearance of the exudate the pain subsides, with an amelioration of all symptoms.

In some cases, the patient is seized with a hard chill, and, with febrile reaction, the temperature rapidly reaches 104° or 105°. The pulse is full and bounding; the face, at first flushed, soon becomes pinched and anxious. The pain is intense; the patient refraining from taking a full inspiration, has the appearance of great anxiety. The pulse soon changes, becoming feeble though rapid, prostration is extreme, and death may follow in forty-eight or seventy-two hours.

When the disease is secondary, the symptoms of the primary disease may so overshadow the affection of the pleura as to escape notice, though the stitch in the side, or an "uneasy" feeling, will call attention to the pleura, and a physical examination will reveal the true condition.

Physical Signs.—Inspection reveals the movement of the chest wall, on the affected side, very much restricted, especially during the first forty-eight hours. Palpation confirms what inspection reveals, while percussion gives a normal sound in the early stage of the disease, to be followed by some dullness when exudation occurs. Auscultation reveals the characteristic and chief diagnostic symptoms of pleurisy.

In the early stage the friction sound is heard, due to the rubbing of the dry, inflamed pleural surfaces, and is more pronounced at the end of inspiration. With the presence of exudation, the friction sound is increased and is heard during expiration and inspiration. If deep breathing is enjoined, the sound is more pronounced.

Diagnosis.—If care is used, pleurisy can scarcely be mistaken for any other affection. The only diseases that might be

mistaken for pleurisy are pleurodynia and intercostal rheumatism. If we remember, however, that the friction sound is always present in pleurisy, and never in the other two affections, we can readily distinguish the one from the other.

Prognosis.—The prognosis is usually favorable, though in rare cases it may speedily terminate fatally.

Treatment.—The earlier Eclectics obtained prompt results in the treatment of pleurisy, and those who can not get into the way of small doses and specific tinctures will find the old way a successful one. 'T is true it is rather unpleasant, though, if the patient is suffering intensely, he is ready to submit to any medication that promises relief.

Where the tongue was *full, pallid, and dirty*, the old compound powder of lobelia or the acetous emetic tincture was given, at first in small doses to produce profound nausea, and then carried to free emesis. This produced relaxation, lowered the temperature, and eased the sharp, lancinating pain. If the pain was intense sudorific tincture, compound tincture of Virginia snake-root, was given in teaspoonful doses, in hot water, every one, two, or three hours. This not only relieved the pain but brought on gentle perspiration, and the patient was soon convalescent.

In the place of this rather unpleasant medication, we give the small dose, and equally efficient remedies in the form of specific tinctures.

Aconite.—For the *small, frequent* pulse, aconite is the sedative to be selected, five gtts. of the tincture, to water four ounces.

Asclepias.—Associated, or rather combined, with the aconite, we will find asclepias an excellent remedy. Where the pain is severe and moves about, is not constant at one point, and the skin hot, either dry or moist, no better remedy can be given. From ten drops to one dram should be added to water four ounces; a teaspoonful every hour.

Bryonia.—This is the remedy of remedies in respiratory lesion with *chest* pain. In pleurisy, the sharp, lancinating, stablike pains will call for bryonia. Ten drops to half a glass of water, and a teaspoonful every hour.

Rhus Tox.—Where the patient is restless, and unable to sleep, or starts suddenly in his sleep with a *sharp stroke* to the pulse, telling us of irritation of the cerebro-spinal centers; where the tongue is reddened at tip and edges and there is elevation of the

papilla, the small dose of rhus will give good results. Ten drops, to water four ounces.

Veratrum.—In an extreme case there will be high temperature, the pulse will be *full, strong, and bounding*. The face will be flushed, there will be throbbing of the carotids, and the pain is intense, agonizing in character. In such a case veratrum, 3i; morph. gr. $\frac{1}{2}$, to water four ounces; a teaspoonful every hour until the pulse feels the force of the remedy, when it should be given every two or three hours.

Local Measures.—In most cases, libradol will afford relief, and is more satisfactory than a blister. In fact, the day for the application of blisters in pleurisy has gone by, and when an active counter-irritant is demanded, the application of chloroform to the spot implicated will give relief.

A hypodermic of morphia may be called for, where the pain is intense in character and we can not wait for the slow effects of internal medication. *Pain* sometimes kills or at least hastens a fatal termination, and the strength of the patient may be greatly prolonged by the timely use of a hypodermic injection. It is *only* to be used, however, in cases like the one just named. Should the pain return in four, five, or six hours, a diaphoretic powder, administered before the pain becomes intense, will be of much benefit.

SERO-FIBRINOUS PLEURISY.

Synonyms.—Subacute Pleurisy; Pleurisy with Effusion.

Etiology.—The causes of sero-fibrinous pleurisy do not differ from those of plastic pleurisy, the difference in the character of the exudate being, no doubt, due to different degrees of intensity in the inflammatory process or to the influence of the various lesions with which it is so frequently associated, such as croupous and broncho pneumonia, pericarditis, hepatitis, peritonitis, nephritis, typhoid fever, carcinomatous conditions, and especially tuberculosis. The frequency with which tuberculosis is preceded by pleurisy or pleuritic symptoms, being proof that the blood is of a poor quality, hence the changed character of the exudate. This is especially so where the exudate is purulent or hemorrhagic.

Pathology.—Sero-fibrinous pleurisy may be the further development of the plastic variety, the serous exudate following later, or the exudation may be serous from the beginning. The

pleural surfaces are covered with a fibrinous exudate, varying greatly in character. In one, it is in the form of a thin, smooth coating, while in another it will be thicker, and assume a rough or shaggy appearance owing to the friction of its surfaces.

If there be no adhesions, the effusion collects in the most dependent portion of the pleura, and, if small in quantity, physical signs will be absent. The amount varies from a few ounces to a gallon or more. The fluid is usually clear, of a pale yellow or brown-green color, though sometimes turbid, of alkaline reaction, and contains red and white corpuscles, leukocytes, endothelial cells, threads of fibrin, albumen, and sometimes crystals of cholesterolin.

As the fluid increases in quantity, certain mechanical changes take place. At first the lung is but slightly retracted; but as the fluid accumulates, the lung is crowded backwards, and from continued pressure becomes almost bloodless and airless—atelectatic. The mediastinum is drawn toward the opposite side by traction of the sound lung. The heart also is slightly displaced. Where the effusion is in the right side, the diaphragm is pressed, crowding the liver downward, while the stomach, colon, and spleen suffer in the same way, if the exudate be in the left pleura.

Symptoms.—Acute sero-fibrinous pleurisy begins insidiously. There may be slight chilly sensations for one or more days, followed by more or less fever, the temperature ranging from 101° in the morning to 103° at night. The pulse is generally small, but frequent, from 100 to 120 per minute. The urine is scanty, partly due to the fever, and partly to diminished arterial pressure.

In rare cases, the invasion is characterized by a severe chill, followed by high temperature, marked arrest of the secretions, sharp pain of a tearing or lancinating character, and marked dyspnea and an irritating cough. The pain is located beneath the nipple, and is often referred to as a stitch in the side, though, in some cases, it is diffused and affects the entire side of the chest. In rare cases, diaphragmatic pleurisy, the pain may be in the epigastric, hypochondriac, or lumbar region.

If the effusion has been very slow in forming, there may be but little dyspnea, although the accumulation be large; generally, however, dyspnea is a characteristic symptom, the breathing being short and catching, and, where the effusion is rapidly formed, the dyspnea is so great that the patient is often unable to lie down.

Cough is an attendant symptom, beginning in the early stage, gradually declining as the exudate increases, again to return with absorption of the fluid. The cough is hacking in character, and attended with an expectoration of scanty mucus, which is not unfrequently streaked with blood. If bronchitis develops, the expectoration becomes quite profuse, and if pneumonia attends, the sputum is rusty colored.

In rare cases, where the primary disease is of a malignant character, or some severe chronic disease, as nephritis, the pleural symptoms may be absent, or so overshadowed as to remain unnoticed until discovered by a physical examination.

Physical Signs.—Since the general symptoms of sero-fibrinous pleurisy are often obscured by the primary disease, it is therefore important to carefully note the more definite and positive physical signs, which quite accurately determine the stage and extent of the lesion.

Inspection.—Inspection reveals the same conditions that we find in dry or plastic pleurisy; namely, increased frequency of respiratory movement; but as the exudate accumulates, restriction of the respiratory movement can be noted, due to the gradual compression of the lung, and when a very large quantity of fluid is present, the respiratory movement may be entirely absent. There will also be a bulging of the middle and lower part of the chest, the intercostal spaces being effaced and the anteroposterior diameter of the chest being increased. The diaphragm is depressed and the shoulder elevated, the affected side being perceptibly larger than its opposite fellow.

If the left chest be involved, the apex beat will be seen to the right of the median line, in the third and fourth interspace; and if the right chest be involved, the impulse will be seen to the left of the nipple, or even to the axillary line in the fourth and fifth interspace. This is quite noticeable if the patient be lean, with thin chest-walls.

Where there is resorption, we notice a gradual return to the normal condition, provided the exudate does not become organized, and adhesion takes place. In such cases there is atrophy of the affected side, which may result in marked deformity, there being retraction with a narrowing of the intercostal spaces, and a dropping of the shoulder, producing more or less, a curvature, the concavity being on the affected side.

Palpation confirms the physical signs revealed by inspection. Thus the expansion movement is found to be much restricted, the interspaces widened and effaced, apical beat displaced to the right or left, ascending to the side affected. Fluctuation and edema are rarely found. Vocal fremitus diminishes as the fluid accumulates, and finally may disappear entirely. As resorption takes place, palpation reveals the progressive steps towards recovery, and where deformity of the chest occurs, palpation outlines the extent of the tissue changes.

Mensuration.—In measuring the affected side, we are to remember that, in right-handed adults, the right chest is the larger; hence the measurement must be as to the expansion of the two sides, the affected side showing one or two inches in excess at the end of expiration. Where there is great effusion, the affected side, of course, also shows an excess in measurement. There will be but slight difference between the sides during inspiration owing to expansion of the sound lung, while the affected lung remains airless.

Percussion.—Early in the disease, percussion gives negative results; but as soon as the fluid amounts to one pint, dullness is elicited, at first posteriorly, and in rare cases, in the infra-axillary region, the amount of effusion can be determined from time to time by the increased dullness. The dullness beginning immediately below the line of fluid, the sound soon becomes flat, like that produced from percussing wood; hence the term wooden.

Beginning at the base posteriorly, the fluid, as it fills the cavity, assumes the form of the letter S, being higher posteriorly. Except in extreme cases, a point of resonance, tympanitic in character, is found just beneath the clavicle, and is known as "Skoda's" resonance. Where there is large accumulation of fluid, the dullness extends quite a distance below the diaphragm, owing to the depression of the viscera—the liver on the right, and the spleen on the left—and should not be confused in the mind of the operator. Unless a very large amount of fluid be present, change of position will vary the dullness and help determine the extent of the exudate. In percussion we are also to bear in mind the slight change in the heart position.

Auscultation.—In the early stage, the breathing is shallow and jerking, owing to pain, and the natural respiratory murmur is diminished; very soon, however, crepitation is heard, either in

the inframammary, the infra-axillary or the infrascapular region, and while it may be heard both during inspiration and expiration, it is more pronounced at the end of inspiration. It may be dry and creaking as of new leather, or it may simulate pneumonia. As the fluid accumulates, the crepitant and respiratory sounds become fainter, finally disappearing, to be replaced by bronchial breathing.

While vocal resonance is greatly diminished or absent over the effused material, it often partakes of a nasal character near the border of the fluid, and resembles, somewhat, the bleating of a goat; hence is termed egophony.

With resorption, we have these adventitious sounds reversed as the fluid disappears, though a return to the normal respiratory murmur is often delayed for many weeks.

SPECIAL CLINICAL FORMS OF ACUTE SERO-FIBRINOUS PLEURISY.—*Tuberculous Pleurisy.*—This form does not differ materially from that just considered, save the additional presence of the specific tubercle and the more certain termination in death. This form is nearly always secondary to pulmonary tuberculosis, and is preceded by such a history. In rare cases, the primary lesion may be located in the pleura and consist of but few areas of tubercles, or there may be innumerable deposits of small tubercles miliary.

The disease may run its course as an acute-fibrinous pleurisy, or the more insidious form of the subacute variety, or become prolonged as chronic pleurisy. Either form may be complicated by pericardial or peritoneal tuberculosis. The exudate is sero-fibrinous in character, and not infrequently is stained with blood.

Diaphragmatic Pleurisy.—In this variety the diaphragmatic portion of the pleura is involved, the pain being located at the insertion of the diaphragm to the tenth rib and extending to the epigastric region. The pain is intense, the patient assuming the sitting posture, slightly bent forward. The respiration is short, catching, and chiefly thoracic. Nausea and vomiting often occur, which greatly adds to the patient's suffering, as does the cough which attends it. The effusion is generally small in quantity, and may be either plastic, sero-fibrinous, or purulent. If purulent, there may be bulging of the intercostal spaces. The temperature range is high in this form, the pain more exquisite, and the patient presents a more anxious expression than in any other form.

Encysted Pleurisy.—As the result of adhesion, the effusion may occupy two or more circumscribed pockets, which may or may not communicate with each other, and may occupy various positions. The symptoms are not pronounced and therefore may be quite difficult of detection. Where percussion reveals circumscribed dullness, with resonance at its border, the character of the lesion would be suggested, which would justify an exploratory puncture with a trocar.

Interlobar Pleurisy.—This form is usually preceded by, or associated with, sero-fibrinous pleurisy, and results from adhesions cutting off the interlobar spaces from the general pleural sac. The encapsuled exudate varies in size from a small egg to a cocoanut, and is found more frequently in the right side than in the left, and between the upper and lower lobus, near the root of the lung.

The symptoms are not characteristic, and after a long period of ill health the abscess may discharge into a bronchus, the expectorated pus being the first indication of a chest lesion. When the abscess is large, the symptoms will be more like that of abscess of the lung.

Hemorrhagic Pleurisy.—This variety is where blood is found in the effused fluid, and in sufficient quantity to be recognized by the unaided eye, and is nearly, if not always, associated with tuberculosis or carcinomatous conditions of the lungs or pleura, or to Bright's disease, cirrhosis of the liver, or low forms of acute, infectious diseases. It is sometimes accidental and the result of puncture by the trocar.

Diagnosis.—If care be taken in noting the physical signs, there will be few mistakes made in the diagnosis, though several lesions might be mistaken for it, if examined superficially. We are to differentiate sero-fibrinous pleurisy from pneumonia. In pneumonia, in addition to the sudden onset, there will be a higher range of temperature, deep flush of the cheeks, the pain will be more diffuse, the cough attended by expectoration of rusty sputum, and there will be a dull sound rather than a flat one on percussion. There will be but little or no distention of the thorax.

Palpation will reveal marked fremitus, save where there is obstruction of a bronchus. Auscultation gives crepitant and subcrepitant rales, and later bronchial breathing and no friction sound; and, lastly, there will be no displacement of neighboring organs.

Hydrothorax is usually associated with renal or cardiac disease, has little or no fever, absence of sharp, stitchlike pain, no friction sound, is often bilateral, and the specific gravity of the fluid is below 1.015, while that of pleurisy is above 1.017.

Pericardiac effusion may be mistaken for sero-fibrinous pleurisy of the left side, but the history of the former, which tells of rheumatism, the marked dyspnea, the feeble heart-sounds, the normal position of the heart, and the resonance heard on the posterior chest-wall and at the base of the lung in the posterolateral region, will distinguish the one from the other.

Tumors and cysts reveal a different history. They are rarely attended by fever, are not accompanied by *uniform* distention, the dullness is more often confined to the upper and middle portion of the lung, and the respiratory murmurs are absent owing to compression of the lung.

Echinococcus cyst of the liver or abscess might be mistaken by crowding upward the lung, but the boundary-line of dullness will show convexity, and the history of the case will be of such a nature as to assist materially in fixing the disease, and the aspirating needle will remove all doubt.

Prognosis.—The prognosis is usually favorable, though much depends upon the etiologic factor. Where the disease is primary, the affection runs a much shorter and more favorable course. If secondary to tuberculosis, or carcinoma, the outlook would be correspondingly bad, and the course of the disease would be of a longer duration. The fever, inflammatory stage, lasts from one to three weeks, during which the effusion takes place, and this is followed by the non-febrile stage, which may last for weeks or months.

Treatment.—The treatment in the early stage will be sedative in character, for just in proportion to our ability to control the inflammatory process, will we control the exudation of serum.

Veratrum.—Occasionally we find a *full, strong, bounding pulse* showing excessive heart power, great excitement, and high grade of inflammation. With these symptoms the patient will be restless and suffer excruciating pain. If not overcome, these conditions lead to grave results. In such cases veratrum is one of the best remedies in the materia medica, and we give it in tangible doses, carefully watching its effects, however, and as the pulse comes under control, the temperature falls, the skin re-

laxes, and the pain subsides, we lessen the size and frequency of the dose. Our prescription with the *above* indication would read:

℞ Veratrumʒss.
 Aquaʒiv. M.
 Sig. Teaspoonful every one, two, or three
 hours.

Aconite.—Many cases will have the small, frequent pulse, and aconite will replace the veratrum, but this remedy will always be used in the small dose. Thus:

℞ Aconitegtt. v.
 Aquaʒiv. M.
 Sig. Teaspoonful every hour.

Asclepias.—This is a splendid remedy in pleurisy. Where the pain is erratic, the skin dry, and the tissues tense, asclepias, one or two drams to half a cup of hot water, a teaspoonful every thirty or sixty minutes, for several doses, will produce relaxation, diaphoresis, lessen pain, and control inflammatory processes.

Bryonia.—This is one of the best remedies for inflammatory conditions of the chest that we possess, for its usefulness is not confined to the acute stage, but is equally efficient where effusion exists. Where the pulse is quick and hard, where there is sharp, stablike pain, and flushed, bright cheek, bryonia, gtt. x; aqua ʒiv; teaspoonful every hour, will prove very beneficial. Many times it will prevent extensive effusion of serum, and, when present, it assists materially in hastening the process of resorption.

Rhus Tox.—Where there is irritation of the cerebro-spinal centers, as shown in the small, *sharp, hard* pulse, elevated papilla on tongue, restless condition of the patient, insomnia with burning sensation in chest, rhus tox., gtt. x; aqua ʒiv; teaspoonful every hour, will give results.

Macrotys.—Where the pain is located in the muscular structure or is rheumatic in character, we add from a half to a teaspoonful of the tincture to the sedative solution. Where these remedies are faithfully given, the effusion will be limited in quantity, and generally will be reabsorbed. In the way of local measures, libradol is perhaps the most efficient agent. It should be renewed as often as it becomes dry, which will be about twenty-four or thirty-six hours.

Where the effusion is large in quantity and of long standing.

the old compound tar-plaster will serve a better purpose ; it should remain on until it produces suppuration, when the surface will be dressed with a simple cerate. If the fluid produces dyspnea and medication fails to bring about absorption, paracentesis should be performed.

The patient should be sitting up, leaning slightly forward, and the arm of the affected side thrown across the chest, with the hand on the opposite shoulder. A *large* aspirating needle, properly sterilized, is introduced, if on the left side, in the seventh interspace in the mid-axillary line. The needle, with boring motion, is made to enter the chest just above the upper border of the rib, the needle slightly upward. If the right side be affected, the puncture is made in the sixth interspace in the same way.

If there is a large quantity of fluid and it is of long standing, it is not best to attempt to open the cavity. The amount drawn will depend somewhat upon the effect it has upon the patient. From ten to twenty ounces may be removed at one operation ; but if dyspnea, cough, and pain attends the operation, the needle must be at once withdrawn. If the accumulation be recent or an active fever be present, a much larger quantity may be withdrawn. On the removal of the needle, the puncture is to be covered with an adhesive strip. If the fluid repeatedly accumulates, the patient is probably tubercular, and recovery is not apt to follow.

PURULENT PLEURITIS.

Synonym.—Empyemia.

Definition.—A suppurative inflammation of the pleura.

Etiology.—A sero-fibrinous pleurisy may be converted through the chest-walls or generated from within. Not unfrequently it results from a penetrating wound, from a fractured rib, or from the aspiratory needle, where due cleanliness has not been observed. It may be due to malignant disease of the lung or esophagus, and not infrequently from abscess of the liver or from caries of rib or spine.

It is frequently due to tuberculosis, and it may follow infectious diseases, especially croupous pneumonia, diphtheria, and scarlet fever, more rarely typhoid fever, measles, and whooping-cough. It has followed a peritonitis and the puerperal state.

Children are peculiarly subject to this form, it being estimated

that one-third of all pleural effusions in children are purulent. The organisms most frequently found in the purulent fluid are the staphylococcus, the streptococcus, the tubercle bacillus, and the micrococcus lanceolatus.

Pathology.—The effusion is usually general, though, as a result of adhesion, it may be encysted. Where the effusion is of long standing, the lung is generally pushed upward and backward, and is flat and almost entirely airless.

The pleura is but little thickened if the effusion is recent, but where it is of long standing, the membranes become thickened and leathery in character. Occasionally necrosis of its walls occur, and the purulent material makes its escape, the direction it takes depending upon the amount of resistance. When the perforation occurs in the pleura costalis, it finds its way outwards, sometimes resulting in necrosis of a rib. Should it perforate the pleura pulmonalis, it finds its way into the lung and is expectorated through the bronchus, or it may perforate the diaphragm, and result in a fatal peritonitis. In rare cases it has penetrated the pericardium.

The character of the pus varies. Sometimes it is of a creamy consistency; again of a sero-purulent form, or of a fibrinous-purulent material. After standing, it separates into an upper greenish or yellowish-green, transparent fluid, and a lower layer of thick greenish pus. When not of long standing, the odor is rather sweetish in character; but if of long standing, and especially if associated with gangrene of the lungs or septicemic condition, the odor will be peculiarly fetid.

Symptoms.—The symptoms vary greatly, depending somewhat upon their cause. Thus, if it occurs as a primary affection, the symptoms are those of acute pleurisy, namely, chills, high febrile action, pain in the side, dyspnea, and cough attended by slight expectoration of a muco-purulent material.

Should the pleurisy be associated with septicemic or pyemic conditions, the symptoms are typhoid in character, the tongue becomes dry and brown, the mind wanders, or coma appears. Such cases generally terminate fatally after running a short course.

Quite often, the disease develops insidiously, with no marked local symptoms to direct attention to the true condition. The

patient's fever is irregular, night-sweats attend, and the patient loses flesh and strength. To render the true character of the disease more obscure, the purulent material, having perforated the pleura, sometimes burrows along the spine to the iliac fossa, resembling psoas or lumbar abscess. When the pus breaks in a bronchus, it is expectorated, and may be mistaken for tuberculosis.

Physical Signs.—The physical signs are practically the same as those of sero-fibrinous pleurisy, and need not be repeated. A few additional signs would be greater bulging of the intercostal spaces, especially where perforation occurs, the appearance of a red spot and fluctuation on palpation; enlargement of the superficial veins and edema of the integument, especially in young subjects, would suggest purulent form.

Diagnosis.—A positive diagnosis of this form of pleurisy can only be made by withdrawing some of the fluid with an aspirating or exploring needle.

Prognosis.—Empyema is always grave, though much depends upon the age of the patient and the causes giving rise to it. More children recover than adults. When the previous health has been good and the family history shows no trace of tuberculosis, the outlook is more favorable.

Should rupture of the sac take place externally, the outlook is somewhat favorable, as it may be where it empties into a bronchus. With the evacuation of pus, there is a tendency to adhesion of its walls, effacement of the cavity, and retraction of the affected side.

Treatment.—Where there is an accumulation of pus in the pleural cavity, we can not expect much help from internal medication until after the cavity has been thoroughly drained. Irrigation should not be used, except in those cases where the fluid is fetid, and even here much care should be observed as there is danger from collapse.

A free incision should be made, or a good sized trocar used, in the mid-axillary line, in the fifth or sixth interspace, proper aseptic measures being used. The patient should be in the sitting posture when able. After thorough draining, the patient should take well-regulated respiratory gymnastics, to increase the expansive power of the compressed lung.

An efficient method is that used at the Johns Hopkins Hospital, and consists in transferring the water from one bottle to another by means of expiration. Large bottles holding at least a gallon, are used, and in these, tubes are placed. By expiring through the tubes the water is made to pass from one bottle to the other. This exercise, to be of benefit, should be carried out systematically and persistently as the strength of the patient will permit. The cavity is thus obliterated by the expansion of the lung on the one hand, and the retraction of the chest wall on the other.

Following the operation for the removal of the pent-up fluids, we will put the patient upon the antiseptic remedy indicated. The chlorates, sulphates, mineral acids, the vegetable antiseptic, echinacea, baptisia, and remedies of like character will be used.

CHRONIC PLEURISY.

Synonym.—Adhesive Pleurisy.

Definition.—A chronic inflammation of the pleural membrane, with or without effusion.

Etiology.—Chronic pleurisy with effusion may follow an attack of acute sero-fibrinous pleurisy, or it may come on insidiously, or follow empyemia; in either case, the causes, conditions, and symptoms are largely the same as those already considered, and need no repetition.

Chronic pleurisy may follow pleurisy with effusion, where the fluid has either been absorbed or withdrawn, in which case there is retraction of the affected side. Not infrequently it comes on insidiously, being chronic from the onset, or it may follow acute plastic pleurisy; pneumonia is not infrequently followed by this form of pleurisy.

Pathology.—Where the pleurisy has followed a sero-fibrinous effusion or pyemia, the pleural surfaces are frequently left covered with a fibrinous exudate, which undergoes organization, the surfaces becoming adherent. In some cases there are prolongations from this new connective tissue, which extend into the interlobular septa of the lung. These extensive tissue changes prevent a free expansion of the lung, which ultimately may re-

sult in fibroid phthisis. Cysts containing a serous fluid or inspissated pus, in which lime salts have been deposited, are sometimes found in the adherent pleural walls.

Where the pleurisy is primary, the membranes become adherent from the fibrinous exudate; but the connective tissue is more apt to be confined to the pleural surfaces, the lung being left free.

When secondary to tuberculosis, small tubercle masses may be found in the walls of the pleura. In some cases there is thickening of the adherent pleura, restricting the free expansion of the lung, and where effusion has proceeded, the dry form restriction and deformity exists.

Symptoms.—Chronic pleurisy manifests itself by occasional sharp, lancinating pains through the affected part, especially after exertion, much talking, coughing, etc. We call the pain sharp and lancinating, but it may be more properly described as an intense, sharp soreness, which catches the part during inspiration, and stops the movement at once; the patient calls it a "stitch in the side." In addition there is frequently soreness on pressure, or when the arm of that side is moved. Respiration is more frequent than usual and somewhat difficult; there is more or less of a hacking cough, sometimes dry, but very frequently attended with expectoration, sometimes copious.

The general health is markedly affected; there is a loss of flesh and strength, the appetite is poor, the bowels are irregular, the skin is harsh and dry, the pulse 96 to 100, and there is much irritability of the nervous system. Usually there is hectic fever in the evening and night-sweats, sometimes as marked as in phthisis.

Physical Signs.—Inspection shows more or less deformity on the affected side. The chest is flat, retracted, with slight curvature and dropping of the shoulder. Compensatory expansion is noted of the opposite chest. The apex beat is feeble, or may be entirely absent, where overlapped by an emphysematous lung or when displaced behind the sternum.

Percussion reveals more or less dullness, depending upon the amount of thickening and compression of the lung.

Auscultation reveals a feeble respiratory murmur, and a cracking friction sound.

Diagnosis.—The history, together with the dyspnea, cough, pain in side, and by noting the physical signs already mentioned, the diagnosis is readily made.

Prognosis.—The prognosis will depend upon the previous history of the patient, length of time affected, the cause, and the general condition of health.

Treatment.—As much, if not more, depends upon improving the general health, as in treating the patient for the local lesion. If we can succeed in giving the patient a good appetite, in aiding digestion, in establishing secretion from the skin, kidneys, and bowels, and in controlling the circulation and innervation, we will have but little difficulty in checking the cough, relieving the pain, promoting absorption, and establishing a cure.

To accomplish the first, the patient must be much in the open sunshine, and, where possible, advise a change of climate, to one where there is a maximum of sunshine, equable temperature, and medium altitude; this, with a good bitter tonic, like nux and hydrastine phosphate, will do much in accomplishing the first part of the cure.

As the appetite is sharpened and digestion improved, there will be better assimilation and blood-making. Proper baths and the saline diuretics, the acetate, citrate or nitrate of potassium, largely diluted, improve the condition of the skin, kidney, and bowels, and promote absorption if effusion be present.

In the way of local treatment, nothing will give better results than the old compound tar-plaster, used until it promotes sup-puration. If much effusion be present, the pleural cavity should be drained.

For the cough and pain, bryonia and asclepias are favorite remedies, though lobelia, sanguinaria, ipecac, sticta, and like remedies, will often be indicated. The antiseptics will sometimes be found useful, and echinacea, the mineral acids, the chlorates, and sulphites will give good results.

PNEUMOTHORAX.

Synonyms.—Sero-Pneumothorax; Pyo-Pneumothorax.

Definition.—A collection of air in the pleural cavity, and, since this is nearly always accompanied by serum or pus, the

terms sero-pneumothorax and pyo-pneumothorax are used interchangeably.

Etiology.—This is a condition of adult life, being rarely found in children, and occurs in males more frequently than in females, the ratio being about two to one. The left chest is more frequently the seat of election.

From seventy to ninety per cent of all cases of pneumothorax are due to pulmonary tuberculosis. Thus a tubercular cavity may rupture into the pleural cavity, or a caseous mass, suppurating, may open into the same and allow the entrance of air. The same conditions may result from gangrene of the lungs, from abscesses, from broncho-pneumonia, or a bronchial fistula may be established through emphysema; hydatids or malignant condition of the lung or esophagus may also be responsible for this lesion. Rupture of air-cells, from a severe paroxysm of coughing, as in whooping-cough, is a possible cause.

The condition may arise from perforation of the diaphragm due to perforating ulcer of the stomach, or from cancer of the stomach or colon, and, in very rare cases, from abscesses of the liver.

Penetrating wounds, or the opening of subpleural abscesses in the pleural cavity, is the most direct means of letting air into the pleura.

Pathology.—In some cases, owing to the valvelike action of the tissues at the seat of perforation, the pleural cavity becomes so distended as to displace the heart and spleen, and, if in the right side, the liver, and crowd the atelectatic lung back against the spine. When the pleura is punctured in this condition, the air escapes with a slight whistling sound. Usually there is but little difficulty in finding the rupture, quite often being located in the postero-lateral region of the lung between the third and sixth ribs.

The pleural surfaces are usually inflamed and covered with a fibrinous exudate of varying consistency. In nearly all cases there is present more or less sero-fibrinous or purulent fluid. Where tuberculosis exists, the walls are softened, and one or more perforations may be found. There may be a communication with a bronchus. The air is peculiarly effusive.

Symptoms.—There is a wide range of symptoms in pneumothorax. They may be so slight as to escape notice, and the condition only determined during an autopsy, or they may be so severe as to almost terminate the life of the patient, and between these extremes every grade is found. . .

The onset is generally sudden, the patient not infrequently being alarmed by the sensation of something having given away, and at the same time experiences, with the first rush of air, an intense pain in the side, great difficulty in breathing, being attended by a quick, small, thready pulse, coldness of extremities, and a pallid, anxious, or cyanotic appearance.

The dyspnea varies according to the amount of air and fluid present, and, where the opening is valvelike in character and egress of air is difficult, the pleura may become greatly distended, compressing the lung of the affected side and causing rapid, shallow breathing, which causes extreme distress and a sense of suffocation. Where the fluid is purulent, there is usually some fever of a hectic character.

Physical Signs.—The character of the physical signs vary according to the amount of air present, and whether only air be present. Where both air and fluid are found, the physical signs are distinct from those where fluid is absent.

Inspection.—Inspection reveals the interspaces filled or bulging and the affected side immobile, while the mobility of the healthy side may be exaggerated. Where the communication with the pleura is free, permitting air to enter and escape, there will be little or no distention. The heartseat is seen to be displaced.

Palpation.—The impulse of the heart is feeble and displaced, while tactile fremitus is diminished above, and may be entirely absent below where effusion is present.

Percussion.—The tympanitic quality of the resonance on percussion will depend upon the quantity of air and the degree of tension with which it is confined. Thus, where there is a communication with a bronchus, the pitch is higher when the mouth is closed, and lower when it is open. This is known as the "Wint-rich Sign," while the "cracked-pot" sound occurs where the air in the pleural cavity connects with the outside air. Where there is

fluid in the pleura, a dull, flat sound is heard as far as the fluid extends. Where there is great distention, the percussion note is high pitched, and when there is great displacement of the heart, resonance may be heard in the cardiac region.

Auscultation.—The natural rhythmic respiratory murmur is very feeble or entirely absent. What breath sounds are heard are feeble and amphoric in character. The respiratory murmur on the well side is exaggerated. If the ear be placed near the spine, bronchial breathing may be heard. A peculiar metallic or tinkling sound is sometimes heard, and is supposed to be due to dropping of fluid from the upper surface into the effused fluid.

The coin test is said to be characteristic and pathognomonic, and is performed by placing a coin flat upon the chest and striking it with another coin while the ear of the auscultator is placed at the back of the chest. The sound thus elicited is a peculiar metallic ringing or bell-like sound, not heard in any other condition.

Hippocratic succussion is also characteristic, and consists of shaking the patient while the ear is applied to the chest, when a splashing sound is heard.

Diagnosis.—The diagnosis is usually not difficult owing to the characteristic physical signs. The bulging of the intercostal spaces, the more or less displacement of the apex beat; the tympanitic percussion noted in the upper part of the chest, with dull or flat sound over the base where the fluid is present; the absent or feeble respiratory murmur; the amphoric breathing; the metallic tinkling sound as the dripping of water; the coin test of Trousseau, and the Hippocratic succussion splash,—make the diagnosis comparatively easy.

Prognosis.—The prognosis depends largely upon the cause. Where it occurs in individuals with good family history, and where the previous health has been good, favorable prognosis can usually be made; but where it occurs in the advanced stages of phthisis, a fatal termination may be looked for in a few weeks.

Treatment.—The treatment is largely palliative or surgical. Thus, where the pain is severe, we have to resort to a hypodermic of morphia, though codein by mouth is preferable where the pain is less acute. Where the tension is extreme, the chest may be punctured by an aspirating needle, and where pus is present it

may be withdrawn as in empyemia. In pyemic conditions, anti-suppurative remedies would be indicated, and where dyspnea is marked, some relief may be obtained from cardiac stimulants and tonics.

HYDROTHORAX.

Synonyms.—Thoracic Dropsy; Dropsy of the Chest; Dropsy of the Pleura.

Definition.—A collection of serous fluid within the pleural cavity without inflammation.

Etiology.—A secondary affection, being usually preceded by nephritis and cardiac lesions, causes of other forms of dropsy. It may also follow profound anemia due to chronic malaria, chronic enteritis, chronic dysentery, syphilis carcinoma, and occasionally it may be due to local causes.

Pathology.—Hydrothorax, unless due to cardiac affections, is usually bilateral. The quantity varies, and is generally greater on one side than the other. The retraction of the lung depends upon the quantity of fluid present, unless previous pleural adhesions have taken place. The fluid is free, not circumscribed. The pleural membrane is somewhat pale, and generally smooth. The fluid is of low specific gravity, 1.010 to 1.012, alkaline in character, clear, and of an amber color.

Symptoms.—The symptoms of the primary lesion may so obscure the condition of the pleura that it may be present for a long time without being suspected. As the fluid increases, however, dyspnea becomes a prominent symptom, and where the fluid has accumulated in large quantities may result in orthopnea, cyanosis, asthmatic seizures, cough and profuse clammy sweating are also common, especially when due to heart lesions.

The physical signs are similar to those of pleurisy with effusion, though the friction sounds are absent.

Diagnosis.—The evidence of fluid in the pleural cavities without pain or fever, and an absence of friction sounds, coupled with a history of lesions of the kidneys, heart, or prolonged anemia, would suggest hydrothorax.

Prognosis.—This depends largely upon the primary lesion.

Treatment.—Since hydrothorax is but a part of general dropsy, our treatment will be directed along the lines for anasarca. We will think of apocynum, strophanthus, convallaria, cretagus, cactus, and such remedies as increase absorption, the action of the kidneys, and add tone to the heart.

Where dyspnea becomes the chief difficulty, the physician will have to resort to aspiration.

PART III.

DISEASES OF THE CIRCULATORY SYSTEM.

I. DISEASE OF THE PERICARDIUM.

PERICARDITIS.

Definition.—An inflammation of the pericardium or serous covering of the heart.

Varieties.—Acute, Plastic or Fibrinous, Subacute or Sero-fibrinous, which includes the Purulent and Hemorrhagic; Adhesive or Chronic Pericarditis.

ACUTE PLASTIC PERICARDITIS.

Synonyms.—Fibrinous Pericarditis; Dry Pericarditis.

Etiology.—This form of pericarditis occurs more frequently in the young and middle-aged than at any other period of life, and occurs in males far more frequently than in females. It may be divided into primary and secondary forms.

The primary form occurs very rarely, though bruises or injuries of various kinds may result in so great an irritation and determination of blood as to give rise to inflammation. The old idea, once so prevalent, that cold was the exciting cause, is rapidly giving way before more careful observation and experimentation, and nearly all writers are now agreed that pericarditis is a secondary affection. Metchinkoff goes so far as to declare that there can be no such a condition as idiopathic pericarditis.

First in importance as a causal factor may be classed rheumatism; Bouillard declaring that in *every* case of rheumatism there will be some lesion of the heart; and while we regard this

as a very extravagant statement, we may be quite conservative and yet place rheumatism as the cause in at least fifty per cent of all cases of pericarditis.

Chronic nephritis and tuberculosis may give rise to the acute form, but is more common in the subacute variety. Toxins from the infectious diseases seem to influence the pericardium quite early, resulting in inflammation. Scarlet fever, measles, diphtheria, influenza, and typhoid fever in particular, give rise to it, though any infectious fever may have its influence in the same direction.

The extension of the inflammatory condition from neighboring organs, especially pleurisy and pneumonia, is a frequent cause, more of this form than of the other varieties. Carcinoma by poisoning the blood and encroaching upon neighboring tissues may give rise to this form.

Pathology.—The changes that occur may be general or local, usually the latter, and are similar to those which occur in pleurisy and peritonitis. At first the membrane is red, smooth, injected, and swollen, but soon becomes rough and thickened by the deposit of a fibrinous exudate. As a result of the friction of the surfaces, the membrane becomes roughened or wrinkled, resembling tripe in appearance, and when the exudate is thick, this friction results in giving the membrane a jagged-looking surface, giving rise to the shaggy or hairy heart of the older writers.

In this variety there is but little serous fluid, the natural secretion being arrested or greatly diminished. The myocardium may also be affected; in fact, there can scarcely ever be a severe pericarditis without involving more or less the heart itself. Where the disease has continued for some time, the heart is apt to be flabby and dilated, with more or less fatty degeneration.

If adhesions of the two surfaces have taken place, there is apt to be hypertrophy of the heart. At other times the nutrition of the heart is so impaired as to give rise to atrophy.

Symptoms.—*Primary Form.*—If the disease is primary, which is very rare, and if the patient be a young subject, there will be a chill, followed by a febrile reaction, a dry skin, scanty secretion of urine, constipation, and the general symptoms of an inflammation.

There is pain in the precordial region that varies from a dull,

aching sensation to one of an intense, sharp, lancinating character, which extends from the nipple to the back and down the left arm. There is a sense of great anxiety, and though there may be but little pain, the patient has an anxious expression that can not be disguised. The pulse varies from one hundred to one hundred and thirty per minute, and in the early stage is full and strong.

If the pleura is involved, there will be embarrassed respiration.

Secondary Form.—Since the very large per cent of cases of pericarditis is preceded by some other disease, the symptoms relating to the heart are more or less obscured, and often the disease is entirely overlooked and the discovery made post-mortem. In confirmation of this is a statement made by an ex-intern of our city hospital, that of five post-mortems that came under his observation where pericarditis was found, not a single case had been diagnosed during life.

If the inflammation be very acute, pain of greater or less intensity will be felt in the precordial region, extending to the left arm, with more or less constriction in the precordial region. Dyspnea is often present, but not a constant feature. The pulse is increased in frequency, and, though full and bounding in the early stage, becomes more feeble in long protracted cases. The fever that attends is rarely severe in character, the temperature not often exceeding 102°.

Physical Signs.—*Inspection*, if the patient be spare, may reveal increased force of the apex-beat. In severe cases the veins of the neck are swollen, and the pulsation of the jugulars are visible.

Palpation.—Palpation may reveal friction fremitus, which is due to the rubbing of the changed pericardial surfaces one upon the other, and is most intense to the left of the sternum. During the early and later stages it is more readily detected, there being but little effusion at these stages.

Percussion.—But little, if any, information is gained by percussion.

Auscultation.—The most positive information, and we might say pathognomonic signs, are obtained by auscultation. The pericardial friction rub is due partly to the exudate and partly to the dry condition of the membrane. This sound is usually double,

and corresponds to both diastole and systole, though it may be triple and sometimes quadruple.

The sound is generally more pronounced than endocardial murmurs, and is harsh or creaking, resembling the sound of bending new leather, the sounds becoming more smooth and diffuse as the effusion increases.

The maximum sound is heard between the fourth and fifth interspace near the sternum. The sound is intensified by changing the pressure of the stethoscope, moderately firm pressure giving the maximum sound, while *very firm* pressure causes it to entirely disappear.

The intensity of the sound is also influenced by the respiration, being usually louder on inspiration, though occasionally louder on expiration. Change of position will also influence and modify the sounds; thus the sitting position gives greater intensity to the sounds than when the patient is lying down.

Diagnosis.—In some cases the diagnosis is very readily made, while in others it is quite difficult, and in some cases impossible. The most positive sign is the characteristic friction rub, and to the skilled and practiced ear, the harsh rubbing or creaking sound near the ear is readily distinguished from the blowing and more distant sound of endocarditis.

We would recognize it from valvular lesions by the more constant and long-continued adventitious sounds of the latter, and also by the fact that change of position from the sitting position to that of lying down does not effect so marked a change in the latter as in the former disease; also, the modified sounds, by changing the degree of pressure of the stethoscope.

Pleural sounds are magnified during respiration; in fact, are suspended if the patient be requested to hold his breath; while in pericarditis the suspension of respiration does not necessarily impair the sounds.

Prognosis.—The prognosis is favorable, so far as life is concerned, the disease rarely terminating fatally; however, there is great danger of more or less adhesions, that leave the heart subject to more serious wrongs in later years. At times it assumes the chronic form.

In rare cases resolution is complete, the disease lasting but a few weeks. Where death occurs, it is usually the result of an

intense primary disease, such as a severe croupous pneumonia, or severe chronic nephritis, or severe valvular disease.

Treatment.—The patient should be made acquainted with his true condition in order that he may the more readily acquiesce in the quietude which he will be compelled to assume to get the best results from treatment. He should occupy the recumbent position the greater part of the time, and should refrain from all conversation or reading that would tend to undue excitement.

The diet should be light, one that is readily appropriated, and given in concentrated form. Very little fluid should be allowed, no more than is absolutely necessary, and hot drinks should be entirely prohibited.

During the acute stage, to control the fever, we use the special sedatives. Aconite for the small frequent pulse, five drops to a half a glass of water, of which a teaspoonful will be given every hour. Occasionally we find excessive heart power in the early stage with a full bounding pulse; in this case veratrum ten to thirty gtt. to a half a glass of water, and a teaspoonful every one, two, or three hours.

Where there is a sense of weight and oppression, not due to effusion, give lobelia a half dram to a half a glass of water, teaspoonful every hour.

Bryonia.—Where there is pain of a sharp, lancinating character, bryonia is a remedy of great merit, being an anti-rheumatic and at the same time an agent whose specific action is upon serous membranes, it is doubly indicated.

Asclepias combines nicely with bryonia, especially if the skin be dry and harsh.

Macrotys will be the better remedy where there is muscular soreness; a dram to a half glass of water will give better results than the small dose. The early Eclectics accomplished better results from a decoction of the fresh root, but this is not readily obtained by the majority of physicians, and we will have to depend upon the less efficient tincture.

After the more active symptoms subside, to establish secretion from the kidneys and promote absorption of the exudate, potassium acetate, well diluted, will be a good treatment.

Digitalis, strychnia, and nitroglycerin must not be used too early, or we will overstimulate and exhaust the power of the

heart, and only when the soft pulse indicates the failing power of the heart are they permissible. Cactus and cretagus, however, may be used at any stage.

When he have the history of rheumatism, the anti-rheumatics, given according to their indicated use, will prove beneficial. If uric acid be present, potassium acetate, or lithiate, should be given till it disappears. Where the patient is able to travel, change of air and climate will often prove highly beneficial, though a very high altitude should be avoided.

PERICARDITIS WITH EFFUSION.

Synonyms.—Sero-fibrinous Pericarditis; Hemorrhagic Pericarditis; Purulent Pericarditis.

Etiology.—This form is frequently preceded by the acute form just described, or, like the former, it follows or is accompanied by rheumatism. Bright's disease is not an infrequent forerunner of it. Tuberculosis is also a common cause, especially of the purulent and hemorrhagic variety. Septicemia and the eruptive fevers are also diseases that should be considered in the purulent and hemorrhagic forms.

In children, the disease may come on so insidiously that quite a pericardial effusion may have taken place before the physician discovers it. In such cases there is generally a tubercular taint.

Pathology.—This variety is frequently, if not always, preceded for a few days by plastic pericarditis, and is attended by the same anatomic changes; namely, a smooth, swollen, and injected membrane, in the early stage, followed soon after by a plastic exudate, usually more pronounced than in the acute form.

The pericardial layers being covered with a sticky exudate, gives the membrane a roughened appearance. This is soon followed, however, by an effusion of variable character and quantity, serum largely predominating.

If the result of rheumatism, the effusion will be serous in character; but if caused by Bright's disease, tuberculosis, cancer, the eruptive fevers, septicemia, or pyemia, the effusion will be of a lower grade, pus largely predominating, or there will be a mixture of pus and blood.

The quantity varies from a few ounces to two or three pints.

With the absorption of the more fluid portion of the exudate, the lymph becomes organized, and adhesions take place, sometimes so firmly as to almost, if not entirely, obliterate the pericardial sac.

If the exudate is composed largely of pus, the myocardium presents a roughened and eroded appearance, and, being softened by the presence of pus, degeneration of its walls takes place, or there will be dilatation and thinning of its walls. Endocarditis is also a frequent result.

Symptoms.—If a primary lesion, a rare case, the symptoms common to all inflammations are present; namely, the chill, followed by fever, accompanied by a dry tongue, arrest of the secretions, increased temperature, and increased frequency of the pulse. There is nausea and sometimes vomiting. Pain of a dull, aching character is felt in the precordial region, or, if the pleura is involved, it will be of a sharp, lancinating character, extending to the back and down the left arm.

As soon as effusion takes place, dyspnea becomes the most distressing feature. If large in quantity, the left lung is burdened by pressure, and the breathing is quite labored. The right ventricle is also pressed upon, obstructing the cardio-pulmonary circulation. Although the pulse may be full and strong during the early stage, it is now small and weak, owing to pressure by the effused material.

When the disease is secondary, the primary lesion may so overshadow it that it will be entirely overlooked, especially if it follow pleurisy or pneumonia, and often the disease is not recognized till the dyspnea becomes marked, or there is effacement of the intercostal spaces; even then the disease has been overlooked and pronounced pleurisy.

In tubercular children, the disease may come on insidiously, the child growing anemic; he is of a waxy or transparent color, with a gradually increasing dyspnea, till the pericardium becomes distended with the effused fluid.

Physical Signs.—*Inspection.*—The skin and mucous surfaces are pale and cyanotic in appearance, and the veins in the neck are usually more distended and prominent than in health.

In the young, there will be, if much effusion, effacement, or even bulging of the intercostal spaces.

The breathing will be labored, and the patient will have an anxious expression peculiar to heart affections. The position, if lying, will be dorsal, though some will experience greater relief by lying upon the left side, thus giving greater relief to the right heart.

As the exudation increases, the upright position is assumed, with the head and shoulders thrown forward.

In the early stage, the apical beat is increased and is quite perceptible, but disappears with the presence of the effusion.

Palpation.—During the early stage, the apical beat is increased and felt in the normal position, but as the exudate appears, it becomes more feeble and is felt at a higher point and to the left, finally disappearing with the increase of the effused material.

Oppolzer taught that the apical beat changed with the position of the patient; thus if the beat had disappeared, changing the patient to the left side, or bending the body forward, would cause its return. Gerhardt, however, well says that this is not peculiar to pericarditis, as the apex beat is changed even in health by change of position.

If myocarditis accompanies the disease, the systole is greatly enfeebled, and the apex beat disappears quite early. In case of hypertrophy, or where there are old adhesions, the apex beat may be retained throughout, notwithstanding the presence of a large quantity of effused fluid.

Percussion.—The increase in dullness depends upon the amount of effusion, the dullness assuming a triangle, the base being dependent. The dullness may extend, in extreme cases, from a half inch to the right of the sternum, to the right nipple line, and as far to the left as the axillary line, and as high as the second, or, in extreme cases, to the first interspace to the left of the sternum.

Should there be old pleural adhesions confining the lungs to the anterior chest-wall, the pericardium, with its fluid, will be carried backward, and percussion in this case would give resonance, the area of dullness being diminished rather than increased.

Auscultation.—The friction sound, already described, is heard during the initial stage, but disappears with the presence of the effusion, to return again with its absorption. The heart-beat, at first strong, becomes gradually weaker as the disease progresses,

and is not due, as has generally been regarded, to the increased distance from the chest-wall by the intervening fluid, but to the weakened condition of the muscular walls of the heart, due to more or less disease of the myocardium as a complication. This view is held by Shrotter, who gives, as proof, that the fetal heart-sounds are heard through a much larger quantity of amniotic fluid than ever occurs in pericarditis.

Where the fluid is small in quantity, we may hear the murmurs due to endocarditis, when this complication exists.

Diagnosis.—This disease is often overlooked, owing to the primary lesion; but if a careful examination is made, it can be recognized by the characteristic friction rub in the early stage, and the triangular area of dullness, extending in severe cases to the first interspace.

The pericardial sound is a rough, grating noise *near* the ear. The endocardial sound is blowing, and *distant* from the ear.

We recognize it from pleurisy by the absence of the sharp, lancinating, stablike pain characteristic of pleurisy, and also by the cessation of the friction sound during a momentary suspension of respiration, the friction sound continuing in pericarditis without regard to respiration; from cardiac dilatation, by the history of rheumatism, of the former, also septic or infectious diseases, and the presence of pain in the cardiac region. In cardiac dilatation there will be a history of heart disease, an absence of fever and pain, and there will be no friction sound in the latter.

Prognosis.—The prognosis in this form must be guarded; for while some cases are so mild as to pass unnoticed, others are so severe as to prove fatal in a few days. In mild cases, the disease may terminate favorably within a week or two, all evidence of inflammation disappearing, and the effusion of serous material be entirely absorbed in the course of two or three weeks. When the disease is the result of scurvy or pyemia, death may occur in forty-eight or seventy-two hours.

The condition of the heart must also be taken into consideration in the prognosis. If the heart be in good condition—that is, if there be no structural change—the prognosis will be favorable, but just in proportion as degenerative changes take place will the outcome be unfavorable.

If endocarditis complicate the disease, valvular lesions are

almost sure to exist, and this always renders the disease more grave, as does dilatation of the heart.

The cause giving rise to the disease must also be taken into consideration in making a prognosis; thus septicemia, scurvy, Bright's disease, and the infectious fevers give rise to a more grave form than rheumatism.

The character of the effusion also determines to a great extent the gravity of the case. Thus, if serum alone is the product, the case may be hopeful; but if it be purulent or hemorrhagic, the outlook will be unfavorable.

Treatment.—In the early stage the treatment will be the same as for the plastic form; namely, absolute quiet, and the avoidance of everything that would irritate or excite the patient. The indicated sedative, and bryonia, asclepias, macrotys, or lobelia will be given, as the case may require. Spigelia will be useful during this stage, where there is a sharp, stabbing pain, accompanied by great oppression and undue anxiety. As the disease progresses and the effusion becomes more pronounced, we rely upon such remedies as give tone to the overburdened heart and stimulate the absorbents to carry off the accumulated fluid. Strophanthus influences the heart favorably when given in the small dose, and at the same time excites the kidneys to greater secretion. To a half glass of water add ten or twenty gtt. of the tincture, and give a teaspoonful every one, two, or three hours.

Apocynum.—Of the many remedies recommended for cardiac troubles, however, I know of no remedy in the materia medica equal to that of apocynum, especially with effusion in the pericardium. The action is similar to that of digitalis, but it is not cumulative. The cardiac impulse grows stronger, the dyspnea becomes less, palpitation disappears, and, through its influence on the kidneys, diuresis is greatly increased. If given in large doses, it produces copious watery stools, and, where the patient is not feeble, this action is not undesirable. If the specific tincture be used, add from ten to thirty drops to a half glass of water, and give a teaspoonful every hour. If you do not secure satisfactory results from this, then use the decoction, made from the fresh root. To two ounces of the crushed root, add ten ounces of water, and reduce one-half; two hours or more should be occupied in its preparation. Strain and add sufficient alcohol

or glycerin to prevent fermentation; of this, commence with five drops, gradually increasing the dose as the stomach will tolerate it, till you reach the maximum dose, one teaspoonful, which may be given every four or five hours. Some patients can not take over ten drops at a dose, the remedy being exceedingly bitter and somewhat nauseating. In dropsies of the heart it has no superior, and I very much question if it has its equal.

Apocynum is also an anti-rheumatic, and where there is edema of the joints it is doubly indicated.

Digitalis.—Where the heart's action is very rapid and feeble, digitalis in the small dose will give good results.

Where rheumatism has been a marked feature in the case, and if there be muscular soreness, macrotys should be used. The early Eclectics obtained great results from the decoction, and where the fresh root can be secured it will often give better results than the tincture, though in most cases the tincture will not disappoint. The dose of the latter will be twenty to thirty drops in a half a glass of water, a teaspoonful every two, three, or four hours.

Cactus.—Where the heart's action is feeble, cactus should be given. This may be alternated with any of the above-mentioned remedies. Where the effusion is very great, causing great dyspnea, and the patient takes on a cyanotic appearance, paracentesis should at once be performed. The fourth interspace near the sternum is the point to be selected. If the patient be very feeble, not more than two or three ounces should be removed at the first operation, more being withdrawn a few days later.

If the effused fluid be of a purulent character, echinacea, baptisia, the chlorates or mineral acids, would be used according to special conditions as expressed by the tongue. Should the effused material be especially offensive, free incision has been recommended and a free drainage established.

The patient should be given nourishing food, though fluids must be restricted to as small amount as is compatible with health. During convalescence, the patient should avoid anything of an exciting nature, and be careful not to do anything that will overtax the heart.

ADHESIVE PERICARDITIS.

Synonym.—Chronic Pericarditis.

Etiology.—The disease may follow an acute attack, the effused material not being completely absorbed, and the sticky, gluey residue becomes organized, and adhesions follow. Again the disease comes on so insidiously that it is never suspected, even though extensive adhesions have taken place, and they are only revealed during an autopsy. In the latter case, no history of an acute attack can be discovered, and the disease becomes chronic from repeated irritations, probably due to rheumatic attacks, or it may be the result of tuberculosis or malignant growths.

Pathology.—The amount of adhesions varies, depending largely upon the character of the inflammation. In some it is very slight, while other cases present a total obliteration of the cavity, and between these extremes are every gradation of organization.

When tuberculosis or malignant growths involve the heart, the thickening is quite extreme. In the rarer case the pericardium undergoes calcification, or even ossification. This follows more often when the effusion has been purulent in character.

Drummond reported a case of extreme calcification of the heart in a sailor aged forty-three, who was able to perform his work up to a few weeks before his death. On autopsy, it was found that the pericardial sac was nearly obliterated, and the pericardial layers were extensively calcified.

The process of calcification had extended so as to involve the heart muscles, in which had developed great bonelike plates, which had to be sawn through, and which had a thickness, in spots, of an inch. The whole posterior surface of the right ventricle was composed of a triangular chalk-plate three inches high and three and one-half inches broad at the base. A thick, bone-like mass ran across the whole left ventricle, penetrating the entire wall of the heart like a wedge, and reaching into the cavity of the left ventricle. ("Twentieth Century Practice.")

Symptoms.—The symptoms are obscure in many cases, and not sufficiently pronounced to attract attention, the disease not being suspected during life, and only revealed post-mortem while searching for other conditions. Where there is extensive thickening or calcification of the pericardium, the circulation is more

or less obstructed and attended by precordial oppression and a sense of constriction and dyspnea. The pulse is rapid, feeble, and irregular, and of low tension, known as the *pulsus paradoxus*.

The free movement of the heart is prevented where the adhesions are marked; hence hypertrophic dilatation of its chambers is a frequent sequence.

Physical Signs.—Since the general symptoms in many cases are insufficient to draw the attention of the physician to the patient's true condition, the attendant should make a physical examination of all of his chronic cases, especially those with a history of rheumatism, for quite definite knowledge may be thus gained.

Inspection.—As a result of the adherent pericardium, there will be a sunken or depressed condition in the intercostal spaces and over the precordial region. One of the most common as well as most valuable signs is "the systolic tug," which occurs with each pulsation and may be seen near the sternum, between the seventh and eighth interspace.

On examining the back of the patient a visible retraction of the chest will be observed between the eleventh and twelfth ribs, during each systole. This is known as Broadent's sign.

If dilatation has not taken place, the apex-beat is visible over a much larger area than normal; but after dilatation, owing to its enfeebled condition, the apex beat can not be seen.

Palpation.—The apex beat remains in a fixed area notwithstanding a change of position. One of the most reliable physical signs is the diastolic rebound or shock following the drawing in of the anterior chest-wall during each systole. This rapid rebounding of the chest-wall may suddenly empty the jugular veins, giving rise to the diastolic collapse, or Friedreich's sign; this, however, may also occur in cardiac dilatation without adhesions.

Percussion.—In a majority of cases of pericarditis there are adhesions between the pleura and pericardium, thus preventing an overlapping of the heart by the lung; this accounts for the increased area of dullness upward and to the left; this, however, is not pathognomonic, as we have a large area of dullness where the pleura is adhered to the chest-wall, and no cardiac lesion.

Auscultation.—The sounds heard on auscultation are variable,

and, on the whole, not very reliable, since similar murmurs are heard in other cardiac affections. Before dilatation takes place, no murmurs are to be heard, but with the gradual dilatation the murmurs begin, increasing in intensity with the progressive increase of the cavities.

Diagnosis.—We are to distinguish this from pericarditis with effusion, and also from simple hypertrophic dilatation. We recognize it from the former by the fixed apex beat not being influenced by change of position, by the concave or depressed precordial region, while in the latter there is convexity or bulging of the intercostal spaces. The diastolic shock or rebound is absent where there is effusion. In simple hypertrophic dilatation the murmurs are almost identical, but the apex beat is not so circumscribed and there is no depression of the interspaces.

Prognosis.—The compensatory changes that take place in hypertrophy of the heart establish a harmonious balance of forces, and the patient, if not overtaxed, is comparatively comfortable, and may live for years after there are pronounced adhesions. In course of time, however, myocardial degeneration takes place, and if this be accompanied by dilatation, a sudden termination need cause no surprise. The disease is very chronic in its character.

Treatment.—The physician is rarely ever consulted in the early stages of the disease, or the diagnosis is not made till such organic changes have taken place that a radical cure is almost out of the question, and the best the physician may hope to accomplish, is to stay further organic changes, relieve such unpleasant complications as may arise, and render the patient as comfortable as possible.

Where the patient is able to profit by such advice, we would recommend for residence a climate where the air is dry, pure, and where there is abundant sunshine and equable temperature; where the patient can live in the open air the greater part of his time with the least expenditure of vital force. He should avoid all excitement and such exercise as would prove exhausting or overtax the heart. The diet should be nutritious and easily digested.

Cactus, digitalis, cretagus, strophanthus, and like remedies, will be administered as they may be needed. Cactus, especially,

will be a good remedy to continue indefinitely, three or four doses per day. Iodide of arsenic, 2x, may be given, with the possible hope that it may assist in the absorption of fibroid deposits, but too much dependence should not be placed in drugs to accomplish this end.

After dilatation becomes marked, cactus, digitalis, and strychnia will be used to support the heart's action, and the patient must be kept very quiet.

HYDROPERICARDIUM.

Synonym.—Dropsy of the Pericardium.

Definition.—Hydropericardium is a non-inflammatory condition of the pericardium, attended by an accumulation of sero-albuminous fluid.

Etiology.—Hydropericardium is generally the result of a retarded or interrupted circulation, and is usually an accompaniment of ascites or general dropsy, which is frequently seen in the last stages of chronic nephritis, or old valvular troubles. It also follows scarlatina, nephritis, tuberculosis, cancer, diabetes, degenerative changes in spleen and liver, Addison's disease, and all conditions leading to marasmus.

It may be due to local causes obstructing the circulation of the coronary vessels, to mediastinal tumors, to aneurism, or to thrombus of the cardiac veins. In fact, any disease that gives rise to the formation of fluid in the cavities may be attended by dropsy of the pericardium.

Pathology.—Hydropericardium is not a disease of itself, but is always secondary; hence a varied condition is presented. It may be, there will be structural disease of the kidney, spleen, liver, or heart itself; frequent valvular lesions are found. The pericardium itself remains unchanged.

The accumulated fluid is usually clear, of an amber color, though it may become turbid by the presence of fibrin or red blood corpuscles. It is alkaline in reaction.

Symptoms.—Being a secondary lesion, and coming on insidiously, we find no pronounced or characteristic symptoms other than dyspnea. If the transudation commences in the ex-

tremities, gradually invades the peritoneum and the pleura, dropsy of the heart undoubtedly prevails, and the dyspnea is the symptom that confirms the condition. There may be a sympathetic cough due to pressure from the distended paricardium. The physical signs, excepting the friction sound, are the same as in pericarditis.

Inspection.—As a rule, inspection fails to throw any light upon the case; in fact, there are no very reliable physical signs, other than those of pericarditis. The pulse depends upon the condition of the heart, though it is generally small and frequent. If there is excessive distention, the patient will have attacks of dizziness or vertigo. The secretion from the kidneys is scanty, turbid, and presents heavy deposits.

Diagnosis.—The distinction between pericarditis with effusion and hydropericardium is not always easy. If we remember, however, that pericarditis is more of an acute disease, is attended with more or less pain, has the characteristic friction sound, and has a history of being preceded by some one of the infectious fevers, rheumatism, pleurisy, and tuberculosis, the diagnosis becomes more easy.

Prognosis.—The prognosis depends almost altogether upon the disease that gives rise to it. If the heart is in good condition, there being no structural change in its valves, orifices, or muscular tissues, the prognosis is quite favorable. If, however, the process of degeneration has taken place in kidney, liver, lung, or spleen, and these are followed by dropsy, the outlook will be unfavorable, even though the heart be in fair condition. Some very severe cases, however, even when the transudation is excessive and is found in all the tissues, make happy and permanent recoveries.

Treatment.—To one who has never used apocynum in hydropericardium, a pleasant surprise awaits him. It is the remedy *par excellence*. Under its administration the secretion from the kidneys is largely increased, the stools become watery, and the fluid from all the tissues rapidly subsides, the dyspnea is relieved, and the heart's action improves.

Where the remedy can not be retained, the compound officinal infusion of digitalis is a good remedy. Convallaria may be used in combination or alternation, and will greatly add to its effi-

ciency. Cactus adds tone to the heart, and should not be overlooked in this disease.

Where there is severe structural change in any of the important viscera, the treatment will simply consist in using such remedies as will aid the heart, and at the same time, as far as possible, carry off the fluid. Where the accumulation is extreme and the dyspnea great, we should perform paracentesis as recommended in pericarditis with effusion.

HEMOPERICARDIUM.

Definition.—Hemopericardium is an infiltration of blood into the pericardium.

Etiology.—This is entirely distinct from the hemorrhagic effusion that occurs in the course of tubercular, cancerous, and cachectic pericarditis, and is most frequently the result of a rupture of an aneurism of the aorta or coronary arteries, and in very rare cases from rupture of the heart. It may also arise from injuries such as bullet wounds, fracture of the ribs, sternum, etc.

Symptoms.—The symptoms vary, and depend altogether upon the exciting cause. Where hemopericardium is the result of a rupture of the myocardium or an aneurism of the aorta, the patient is suddenly seized with excruciating pain, a deathly pallor or dusky hue overspreads the face, and the patient dies quite suddenly. When due to rupture of a small aneurism of the coronary artery or one of its branches, and but a small quantity of blood finds its way into the pericardium, the results are not so serious, though it is attended by dyspnea and a sense of fullness in the pericardial region. If the infiltration continues, the distention becomes extreme, the dyspnea painful to observe, the pulse weak, and the patient dies of exhaustion. The physical signs are the same as in hydropericardium.

Diagnosis.—The diagnosis is often made only during an autopsy. When a person is known to have had an aortic aneurism, or a myocarditis, and is suddenly seized with excruciating pain, becomes pallid, followed by collapse and death, hemopericardium may be suspected. When the patient has suffered violence by a knife-stab, bullet wound, etc., the diagnosis is not so difficult.

Prognosis.—The prognosis is almost always unfavorable, though aspiration, followed by judicious treatment, has resulted favorably in a few cases.

Treatment.—Stimulants, such as strychnia, nitroglycerine, and camphor and ether, hypodermically to support the heart, will be used, and absolute quiet and rest must be enjoined. If the distention is great, aspiration should not be delayed. Eichorst reports a case where he averted death by this measure. Should the patient survive the first few days, the treatment would be symptomatic, the remedies used in hydropericardium and pericarditis being chiefly used.

Aspiration might be followed by the introduction of a pint of normal saline solution directly into the circulation, with the hope that its effects would prove of permanent value.

PNEUMO-PERICARDIUM.

Definition.—Pneumo-pericardium is an accumulation of air in the pericardium.

Etiology.—The presence of air or gas in the pericardium is a rare disease, and occurs by the establishment of communication with the air, either through diseased processes, such as cancerous or tubercular ulceration or through injuries; thus a ruptured pulmonary cavity might result in this condition, or the perforation of the esophagus by malignant processes would give rise to this lesion. Sometimes pus in the pericardium will generate gas, and consequently be a causal factor.

Pathology.—Pneumo-pericardium, pure and simple, seldom, if ever, occurs, and is a combination of air and pus, air and serum, or air and blood, and should properly be termed pyopneumo-pericardium, seropneumo-pericardium, and hemopneumo-pericardium. Not infrequently pericarditis is set up as a complication.

Symptoms.—The symptoms of this affection are similar to those of pericarditis with effusion, and can only be distinguished from the latter by the physical signs. The pericardium is distended, and percussion reveals dullness and resonance according

to the amount of air and fluid present. These sounds change with change of position.

Auscultation reveals a splashing or metallic sound, due to the movements of the heart in the fluid and gaseous contents of the pericardium. These are quite pronounced, and sometimes may be heard without placing the ear to the chest.

If pericarditis exists, the friction sound may also be heard. The pulse is weak and the dyspnea is a marked feature. The disease is usually of short duration, terminating generally in death.

Diagnosis.—By careful attention to the physical signs already mentioned, the condition can usually be recognized.

Prognosis.—The prognosis is nearly always unfavorable, owing to the nature of the disease giving rise to it.

Treatment.—The treatment will be about the same as that recommended for pericarditis and hemopericardium, though but little hope may be entertained in this disease. The pericardium should be punctured with an aspirating needle or small trocar, which will give temporary relief.

CHYLO-PERICARDIUM.

Cases have been reported where, owing to a rupture of the lacteal vessels, an accumulation of chyle takes place in the pericardium. The physical signs show an increased dullness, but the diagnosis could only be made post-mortem.

II. DISEASES OF THE HEART.

ENDOCARDITIS.

Definition.—Endocarditis is an inflammation of the lining membrane of the heart, and is generally confined to the valves, though other parts may be affected.

Varieties.—There are two varieties of endocarditis, acute and chronic; the former being again divided into acute proper, and ulcerative or malignant.

SIMPLE ACUTE ENDOCARDITIS.

Synonym.—Endocarditis Verrucosa.

Definition.—Simple acute endocarditis is an inflammation of the endocardium, characterized by the formation of small, beady excrescences on the margin of the valves.

Etiology.—Endocarditis is rarely, if ever, a primary affection, and where there is apparently no antecedent lesion to account for it, there is in all probability an acid or toxin that has not given rise to any marked lesion, yet has existed in latent form.

Rheumatism stands first as a causative factor. Pepper says it is the cause in from 60 to 85 per cent of cases examined.

Pneumonia is also a fruitful source of this affection; so is Bright's disease and the infectious fevers, scarlatina especially; but in measles, diphtheria, and typhoid fever, endocarditis is rare. Chorea and tonsillitis, when of a severe type, have also been found to precede this affection.

Stengler and Wegheim each records gonorrhea as an important factor in producing endocarditis, though this and the septic fevers are more likely to result in the ulcerative or malignant forms. Syphilis may also give rise to endocarditis.

Pathology.—The morbid changes are, first, a reddened and injected appearance of the endothelium, which soon becomes opaque and swollen from congestion of the small blood-vessels. This swelling or thickening of the membrane furnishes a favorable resting-place for deposits of fibrin, and we have small, beady deposits from the size of a pin-point to that of a pea, or even larger. These small, beady excrescences may become detached, and, floating off in the general current, give rise to embolism in distant parts; viz., the brain, kidneys, or spleen; and, as a result of this, we may have hemorrhagic infarction of these organs.

The inflammation is mostly confined to the valves, the mitral being far more frequently involved, the aortic following next.

Osler gives an estimate of the frequency with which, in one hundred and eighty-seven cases, different parts of the heart were affected, as follows: Aortic valves, 53; mitral valves, 77; tricuspid valves, 19; the pulmonary valves, 15; and the heart-walls, 33. The left heart is most constantly affected in the adult; the right in fetal endocarditis; the reason, as explained by Anders,

is that before birth the right side, and after birth the left side, are the most active, and that this increased activity accounts for the location of the inflammation. The lesion may not be confined to the valves, but include the endothelial lining of the cavities, and also the chordæ tendineæ.

When resolution takes place, the excrescences are gradually absorbed, though there is apt to remain some thickening of the tissue. As a result of the inflammatory process, there is nearly always more or less myocarditis, and in severer cases the pericardium will share in the general ravages.

Symptoms.—Perhaps in the whole range of heart affections there are few as well-defined subjective symptoms present as in endocarditis. The disease comes on so insidiously that its presence is confirmed before it is recognized, or possibly never is known unless determined by an autopsy.

The symptoms commonly given—pain in the precordial region extending from the left nipple to the back and down the left arm, palpitation, and dyspnea—may occur in pericarditis or myocarditis, or they may be entirely absent. However, if the patient is suffering from rheumatism, and there is an increase in fever, rapid pulse, increase of temperature, pain in the region of the heart, with dyspnea, a careful examination must be at once made for the characteristic bellows murmur. In the more aggravated cases, the patient will lie on the back, or incline to the left side. There will be distention of the veins of the neck, with marked cyanosis.

Physical Signs.—*Inspection.*—The patient is found lying on his back, or inclined to the left side. In severe forms there will be fullness of the cervical veins, with a general cyanotic appearance. The apex beat may be visibly increased, though usually not perceptible.

Palpation.—The results of inspection are confirmed by palpation. The impulse, if weak, suggests myocarditis as a complication. In some cases a systolic thrill may be recognized.

Percussion.—Percussion gives negative results in a large per cent of cases; but if complicated by myocarditis with dilatation, the area of dullness will be increased, especially in the transverse diameter.

Auscultation.—Auscultation gives us the most positive in-

formation in the blowing systolic murmur, telling us of mitral insufficiency. There may be aortic murmurs accompanying this, or a double systolic murmur over the tricuspid valves. If the endocarditis arises as a complication of chronic valvular disease, the sounds of the latter are but little, if any, changed, hence are but of little diagnostic value. We are to remember, however, that these adventitious sounds may be heard in other affections of the heart, or they may be so feeble as not to be recognizable at all.

Diagnosis.—This is a disease that is very apt to be overlooked, unless the more pronounced symptoms are present; namely, rapidity and irregularity of the heart-beat, distress in the precordial region, and dyspnea with mitral murmur. It is important, therefore, in all cases of acute rheumatism and the infectious diseases, to make a thorough physical examination of the chest daily. If the murmur is soft and over the base of the heart, it is most likely due to anemia or to functional derangements; but if it be over the apex, and is the mitral systolic murmur, the diagnosis is quite conclusive.

To distinguish the ulcerative or malignant from the acute is often impossible, though the aggravated symptoms attending the latter enable us to recognize it from myocarditis:

Prognosis.—If no complications exist, endocarditis rarely proves fatal at the time, though it is often the beginning of permanent lesions of the valves. If the primary lesion is grave, the prognosis must be guarded, or if complicated with myocarditis or pericarditis, it will result unfavorably.

Treatment.—The prevention of endocarditis can be accomplished in many cases, if the proper anti-rheumatics are used in the primary disease. If the result of infectious fevers, rest in bed, precaution against taking cold, and the proper antiseptics, will give the minimum cases of endocarditis.

In the management of this affection, great care must be taken to secure rest and quiet. The patient should be placed between blankets, and all company, or anything that would tend to excite the patient, must be forbidden. For the excitation of the heart in the early stage, we use the direct sedative,—aconite for the small, frequent pulse, or veratrum if the pulse be full and strong. For the dyspnea, lobelia is one of our best remedies; ten to twenty drops to water four ounces.

For the pain, if there is muscular soreness, use macrotys one-half dram, to four ounces of water. If the pain is sharp and lancinating, simulating pleurisy, bryonia is the better agent: ten drops, to water four ounces. If there is puffiness of the face, swelling of the joints, with pericardial effusion, apocynum is to be given. When the heart becomes weak, cactus, digitalis, convallaria, or strophanthus may be given. Where there is great oppression or a sense of constriction of the chest, with sharp, stabbing pains, give spigelia.

Alcoholic stimulants, nitroglycerin, and strychnia are to be freely given when the heart flags. Iodide of potassium has long been given for its supposed influence in producing absorption of the vegetative growths, but its beneficial effects have been largely magnified.

The diet should be generous, though easily digested, and a sparing use of fluids should be advised. The convalescent period should be watched very carefully, to prevent taking cold, and also to avoid any and all exercise or excitement that would produce a strain upon the weakened valves. A climate where the temperature is equable and there is plenty of sunshine, and not of too high altitude, will be the most beneficial.

ULCERATIVE ENDOCARDITIS.

Synonyms.—Malignant Endocarditis; Infectious Endocarditis; Mycotic Endocarditis; Diphtheritic Endocarditis.

Definition.—A form of endocarditis developed during some severe infectious or septic disease, and usually characterized by ulceration or suppuration of the valves. It seldom occurs as a primary affection, though a few cases have been reported.

Etiology.—One of the most frequent diseases to be followed by ulceration is pneumonia. Of two hundred and nine cases reported by Osler, twenty-five per cent were due to pneumonia; in fact, endocarditis with pulmonary lesions is very apt to be malignant in character. Rheumatism precedes this form of the disease much less frequently than in the simple form. Septicemia, puerperal fever, and the infectious fevers generally, may act as a primary cause. Tuberculosis, typhoid fever, and diphtheria are seldom accompanied or followed by this form.

Gonorrhea more frequently precedes this form of the disease than the acute variety. Simple acute endocarditis occasionally terminates in the ulcerative form, some septic process of unknown origin having developed. Old valvular lesions are frequent factors in causing endocarditis. It is mostly a disease of middle life, few cases being found in the extremes of life.

Pathology.—As in the simple form, it is the valves that are first affected and upon which the ulcerative and suppurative process expends itself, though there is a tendency to extend to greater areas of the endocardium. The sites most frequently selected are the ventricular surface of the aortic, and the auricular face of the mitral valves, these surfaces being subjected to the greatest friction. The relative frequency of the different valves may be seen from a report of 209 cases examined. Aortic and mitral valves together, 41; aortic valves alone, 53; mitral valves, 77; tricuspid in 19, pulmonary valves in 15, and the heart-wall in 33 instances. In 9 cases the right heart alone was involved.

The vegetative excrescences are the seat of the ulcerations. They become yellow, soft, and finally may break down, forming abscesses. The ulceration may pass deeper than the membrane, even to suppuration and sometimes perforation. As a result of the partial destruction of the valves, an acute valvular aneurism may occur, though this is rare. As a result of direct extension, purulent myocarditis or pericarditis sometimes takes place.

The secondary or distant lesions of ulcerative or malignant endocarditis are due to septic intoxication or to embolism. When due to the former, we find the spleen, liver, and kidneys enlarged and undergoing degeneration. In case of the latter the softened vegetative deposits may be washed into the blood-current as in the acute cases, with the same result.

If the mitral and aortic valves are the ones involved, the systemic circulation is poisoned and the emboli are lodged in the spleen, kidneys, brain, or cutaneous vessels, while if the tricuspid or pulmonary valves are the seat of ulceration, the lungs are the seat of infarction. Where the brain is involved in this way, meningeal lesions are found, or the deeper structures may be involved, paralysis and softening of the brain following. Various micro-organisms are found at the points of ulceration, the pus-forming kind predominating.

Symptoms.—The symptoms embrace the widest range, including all that are observed in the simple form, with the addition of all those due to intoxication and embolic complication, or they may be so obscure as not to arouse even a suspicion of heart lesion; in fact, quite a large per cent of endocardial cases are only recognized post-mortem. This being the case it is exceedingly difficult to give a satisfactory description of the symptoms of this lesion.

There may be an aggravation of all the symptoms of the primary disease, plus an irregular and frequent pulse, slight pain, and more or less dyspnea. If the patient is suffering with acute rheumatism, and there is a sudden rise of temperature, an irregular pulse, and oppression in the precordial region, our attention should be turned to the endocardium; or if there are no local symptoms pointing to the heart, and yet a sudden rise of temperature takes place, with irregular pulse, even though there is no aggravation of the joint affection, endocarditis should be suspected.

Should there be emboli, the symptoms would depend upon their location. For example, if located in the kidney, there would be scanty secretion of urine, containing more or less blood. Where the infarcts are in the spleen, there would be severe pain in the left hypochondrium, great tenderness, and more or less peritonitis. If the meningitis develop or hemiplegia suddenly occur, followed by coma, we think of cerebral emboli; while gangrene of the lung with the accompanying pulmonary symptoms, would leave no doubt as to the cause.

Some cases resemble a remittent fever, with irregular pulse and dyspnea, as additional symptoms, directing our attention to the heart. Sometimes in chronic valvular disease, fever suddenly develops, the temperature rises rapidly, there is an anxious expression of countenance, with a sense of oppression in the cardiac region with or without pain; in such cases endocarditis is present. Aside from these varied and irregular forms of endocarditis, two special types have been recognized,—the typhoid and the septic, or pyemic.

Typhoid Type.—Should the disease come on gradually with the customary prodromal symptoms, malaise, headache, etc., the physician is very apt to mistake it for typhoid fever, especially when the above is followed by high temperature, with daily re-

missions, tympanites, diarrhea, and an eruption somewhat similar to that of typhoid, a delirium not unlike it, and followed by coma and picking at the bedclothes.

The tongue is dry and brown, with sordes on the teeth and lips. In these cases, the cardiac symptoms are completely overlooked, and, even if suspected, a careful examination may fail to reveal the true condition.

The *Septic Type* is apt to follow suppurative processes, like necrosis of bone, puerperal septicemia, and similar lesions. The invasion is usually sudden, and announced by a chill or rigor. The fever is of a remittent type, the temperature frequently being very high. In some cases there is an intermittent fever, the chill being a characteristic feature. The patient takes on a cachectic appearance, has night-sweats, the tongue becomes dry and brown, the breath is foul, prostration is great, and emaciation rapid. The pulse is rapid, feeble, and sometimes irregular. When dyspnea is marked, the disease is recognized where it otherwise would be overlooked.

The disease runs a varied course, though usually a few weeks is sufficient time for a fatal termination.

Pericarditis and myocarditis are grave complications, and always add to the gravity of the disease. Pneumonia and pleurisy may complicate endocarditis, but are more apt to precede it. The physical signs differ but little from the acute form.

Diagnosis.—The diagnosis is many times extremely difficult, especially where the local symptoms are not pronounced. It may be taken for septicemia or typhoid fever, especially where the forming stage is of long duration. Usually, however, the onset is more sudden than that of typhoid, there is less engorgement of the spleen, and the rash is not the characteristic eruption of typhoid; coupled with this are the frequent chills, copious sweats, and great prostration. In nearly all cases, however, if the pulse is carefully studied, the breathing noted, and the chest carefully examined, the disease will be recognized.

Prognosis.—The prognosis is usually unfavorable, always so when of a severe type. Mild cases may recover, though such cases, when reported, may have been due to a mistaken diagnosis.

Treatment.—The treatment will be supportive and antiseptic. In the ulcerative or malignant form, the cause of the sepsis *must*

not be overlooked, for if the source of the stream be poisoned, the body to which it flows must certainly partake of its character. The heart may be poisoned by an old metritis or gonorrhea, or a foul ulcerative condition of the rectum, or there may be sepsis from some bone lesions, or tuberculosis in some one of its many forms. These wrongs *must be corrected*, for to overlook them is to court defeat.

The source of infection must be removed. The various antizymotics will then be indicated. Echinacea one dram, to water four ounces, or baptisia, or it may be the mineral acids, will be called for; if the tongue be red and dry, the latter would be specific. The chlorates would take the place of acids if there be a coated tongue or fetid breath, or the sulphites, if the tongue be coated with a moist, dirty coating.

The diet should be nutritious and easily digested. The secretions from the skin, kidneys, and bowels are to be carefully looked after, in the hope of removing the waste of the tissues, and preventing the toxins from further infecting the system. During convalescence, and for a long time after, the patient should exercise great care against taking cold. Recurring endocarditis is of frequent occurrence.

Cacius to assist the heart's action and relieve some of the unpleasant features, must not be overlooked. Stimulants will be used freely when the heart flags.

CHRONIC ENDOCARDITIS.

Synonyms.—Chronic Interstitial Endocarditis; Sclerotic Endocarditis; Fibroid Endocarditis.

Definition.—A chronic inflammation of the endocardium resulting in degenerative changes in the valves and orifices.

Etiology.—In studying the causes of this condition, two classes are to be recognized, the one following acute endocarditis, the other beginning as a chronic inflammation. The great majority of valvular changes follow an attack of acute endocarditis, and all writers and observers are a unit in declaring that over 50 per cent of all such cases can be traced to acute rheumatism; especially is this true where the disease occurs in children and young adults.

A certain number of cases of acute endocarditis are found where the rheumatism was of a vague character, and not recognized as such during life. Where there is no history of rheumatism, the acute endocarditis may have followed scarlet fever, diphtheria, measles, or pneumonia. Chorea is also responsible for the acute form in children, and which in turn is followed by chronic endocarditis. It will thus be seen that the disease, no matter what the exciting cause, precedes the chronic form in the great majority of cases.

In the second class, the organic changes are frequently the result of syphilis, malaria, chronic rheumatism, gout, and alcoholism, which is most likely due to the presence of toxins setting up an irritation which develops the disease.

Severe physical exertion, by increasing the arterial tension, provokes an irritation that is followed by endocarditis. This accounts for the number of cases of valvular heart disease found in athletes and laborers whose work necessitates unusual physical exertion, such as molders, boiler-makers, draymen, and soldiers who make long marches.

Arterial sclerosis and Bright's disease give rise to the disease in the same way; namely, by increasing the arterial tension to the point of constant irritation. Traumatism, following a severe blow or crushing injury, has been known to give rise to valvular changes.

Predisposing Causes.—*Heredity* is generally regarded as predisposing to chronic endocarditis, and the number of heart affections found in some families can hardly be ascribed to mere coincidence, but is in all probability due to the weakened constitution bequeathed to the offspring.

Age determines largely the seat of the interstitial changes. Thus fetal endocarditis affects the right side of the heart, the tricuspid valves being the seat of the disease. In children and early adult life the mitral valve suffers most, while the aortic valve is found affected most frequently in advanced age, though it may be found in early manhood if great physical exertion has been practiced.

Sex.—According to the statistics of F. J. Smith, mitral stenosis occurs more often in women than in men, the ratio being four to one. The reason given for this greater frequency is, that girls and women are more subject to chorea and rheumatism.

Pathology.—The pathological changes are generally confined to the valves, though the entire endocardium may share in the tissue change. The membrane becomes dull, opaque, and covered with an exudate, the membrane losing its elasticity. There is a proliferation of connective tissue-cells in the endothelium, and an infiltration of round cells in the sub-endothelial tissue. These products of inflammation become organized, and give rise to thickening, induration, adhesion, and contraction; and in the advanced stage of the disease, calcification sometimes takes place. As the result of these organic changes the valves and orifices are variously affected.

The tissue changes begin on the surface, where there is the greatest pressure; thus, when the semilunar valves are affected, the primary lesion begins on the ventricular face, the Aurantian body being involved. When the auriculo-ventricular valves are involved, the auricular side is the first impressed.

As progressive changes take place peculiar results follow. At first the base of the valve is involved, to be followed by partial agglutination of the segments. As they contract, they imperfectly close the orifice and we have valvular insufficiency.

The curling of the valves in some cases is so pronounced as to leave mere stubs. These thickened valves offer obstruction to the free flow of blood, and by their failure to completely close the orifice, permit a regurgitation of blood.

When the mitral valve is the one involved, the edges sometimes become adherent, and as the thickened chordæ tendineæ contract, the valves are drawn into the ventricles, giving it a funnel-shaped appearance.

The more extensive the adhesions, the smaller becomes the opening, and in some cases but a small narrow slit is observed, and is known as the buttonhole slit. Similar changes may take place in the aortic valves, with very similar results. The curling and consequent shortening of the thickened segments permit regurgitation of blood, and where the lining of the orifice becomes involved, a thickened ring lessens the size of the orifice, giving rise to more or less stenosis.

The inflammation may extend a short distance into the aorta, producing sclerosis of its walls. Less rarely we find these same processes taking place at the orifice of the pulmonary artery, the

semilunar valves undergoing the same change in varying degrees as the semilunar valves of the aorta.

The tricuspid valves may share in the destructive changes with varying gradation, and give rise to insufficiency of the valves, obstruction to the free flow of blood by their thickened surfaces, and permit regurgitation of blood. These sclerotic valves may finally undergo degeneration and necrosis, following which, atheromatous ulcers may form, which in turn still undergo further change by calcification. These distorted valves are then recognized as cartilaginous or ossified valves.

The diagnosis of these changed conditions, as well as their altered function, will be studied separately under the head of Valvular Lesions.

Endocarditis, separate from valvular lesions, while very rare, may sometimes exist. This does not necessarily imply a uniform thickening, but shows a varied condition. The tissue changes may extend deep into the myocardium, to be followed by necrosis and ulceration.

III. CHRONIC VALVULAR DISEASES.

AORTIC INCOMPETENCY.

Synonyms.—Aortic Insufficiency; Aortic Regurgitation.

Definition.—Inability of the aortic valves to properly close an abnormally large aortic opening, or a change in the segments whereby they are shortened by curling of the leaflets, or by calcification.

Etiology.—The predisposing causes of aortic insufficiency are age and sex.

Age.—This is a disease largely of middle or advanced life, though an occasional case is found in early life.

Sex.—Aortic lesions prevail far more frequently in males than females, due to greater exposure, greater dissipation, and greater physical strain or exertion.

Exciting Causes.—*Congenital insufficiency* is a rare condition, and is due to malformation of the valves, owing to a fusion of two segments, most commonly those behind which the coronary arteries are given off; even this may not, for some time,

give rise to incompetency; but the malformed segments invite sclerotic changes, and unless the individual leads a very quiet and careful life, sclerosis of the valve is almost sure to develop.

Acute Endocarditis.—That acute endocarditis occasionally gives rise to aortic lesions, can not be denied, though this lesion usually expends its force upon the mitral valves. When it does occur it is generally the result of necrosis followed by ulceration, and this in turn by early death.

In the young, it may be caused by rheumatic endocarditis, though more often this lesion gives rise to auriculo-ventricular changes. Acute affections, however, give the smaller per cent of cases of aortic lesions, long continued irritation from various sources being the common cause.

Strain.—The frequency with which aortic incompetency is found in strong, able-bodied men, whose occupation entailed long-continued physical exertion, called the attention of the profession to the increased tension the segments sustained during the ventricular diastole. So frequently has this lesion been found in those devoted to athletics, that it is often termed the "athlete's heart." This probably explains the frequency with which a runner falls in a dead faint in the last spurt of a long race.

Syphilis.—That Nemesis which pursues its victim to the grave, and which saps and poisons the vitality of its victim, works its destructive influence upon the aortic valve, and though this is frequently associated with other causes, may of itself produce the lesion. Syphilis is found to a great extent among sailors and soldiers, and the frequency with which this class of men suffer from valvular troubles can not be said to be merely a coincidence.

Alcohol.—Alcohol, by raising the tension in the aortic system, plays no small part as a causal factor, by inducing sclerotic changes in the valve segments.

Uric Acid.—That uric acid has its influence in giving rise to sclerotic changes can not be doubted, since it is a well-known product of various forms of gout and chronic rheumatism, and the etiological bearing of these diseases to valvular changes, is, most likely, largely due to the presence of uric acid. In this way lead poisoning should be considered a factor in producing interstitial changes in the valves, as it favors the accumulation of uric acid.

Aortic incompetency may in rare cases be the result of dila-

tation of the arch of the aorta near the valves, owing to arterial sclerosis.

An aneurism above the aortic ring would give rise to the same condition. In this case the insufficiency would be relative.

Pathology.—The change of structure in some cases is entirely in the orifice, the valves being normal, but fail to properly close the abnormally large orifice. This is known as relative insufficiency, and is generally caused by an aneurism or arteriosclerosis; according to Burke, there is a gradual enlargement of the aortic orifice from birth, when it is 20 mm. to the age of twenty-one, when it has reached 60 mm., and after remaining quiescent for twenty years, it again undergoes progressive enlargement for another thirty or forty years; yet, notwithstanding these changes, aortic insufficiency from this source is quite rare.

The valvular lesions are quite varied, and as they are progressive in character, other parts of the heart become involved, which may ultimately involve the entire organ. These changes may be noted somewhat in detail, and are as follows: The lesion may be confined to one or two of the semilunar segments, though usually all three are involved. There may be simply thickening of the valves, which render them stiff and less expansive, interfering with their rhythmic closure, and thus permitting slight regurgitation of blood.

More frequently, the segments are contracted and curled, thus imperfectly closing the orifice, the regurgitation being marked. At other times a segment will become adherent to the intima of the aorta, and the diseased segments in rare cases show laceration following a severe strain. The valves may become rigid from calcareous deposits, and appear petrified, the so-called ossification of the valves.

Arterio-sclerosis of the arch, or atheromatous deposits, may so obstruct the circulation of the coronary arteries that the nutrition of the heart will suffer, followed by degeneration.

Further changes in the heart are slow and progressive and due to regurgitation. The failure of the valves to properly close the orifice permits the blood to flow back into the left ventricle, and there meets the blood coming from the left auricle; as a result of this overdistension, dilatation of the left ventricle follows. The increased volume of blood in the ventricle calls for

increased contractile power to expel its contents, and this over-exertion results in compensatory hypertrophy. The hypertrophy in some cases reaches an enormous size, and is known as the cor-bovinum—beef-heart.

Dulles records a case where the heart weighed forty-eight ounces. As a result of this dilatation and hypertrophy of the left ventricle, the trabeculæ and papillary muscles become flattened by the intracardial pressure, the auriculo-ventricular opening becomes enlarged, and as a result the mitral valve fails to properly close the opening, and mitral insufficiency is the result. This leads to dilatation and hypertrophy of the left auricle. The result of this causes engorgement of the lungs, and finally involvement of the right heart. These compensatory changes take place very gradually and with but little effect on the general health, and if no undue or excessive work is required, the patient may live for years with but little inconvenience.

Finally, however, the changes become so marked that the heart fails to properly propel and empty its contents, and engorgement of the lungs follows, cyanosis and dropsy speedily develop, and the case terminates fatally.

Symptoms.—The symptoms include a very wide range of phenomena, from the mildest to the most pronounced and characteristic. The disease in some cases comes on so insidiously, and the compensatory changes so gradually develop, that the heart is able, if no undue expenditure is called for, to properly perform its function, and the disease is only discovered shortly before death, or in some cases during an autopsy. Most frequently, however, local symptoms develop that draw our attention to this organ, and a careful examination reveals the lesion.

After the hypertrophy becomes marked, great mental excitement or unusual physical exertion is followed by cerebral disturbances, and the patient complains of dizziness, headache, ringing in the ears, flashes of heat, and disturbed vision.

The face may become dusky, and there is throbbing of the arteries. As a result of the cardiac disturbance, there is a sense of oppression, and dyspnea becomes more or less distressing. Pain is a frequent distressing feature, and may be intense, extending down the left arm to the finger-tips, or it may be located under the shoulder-blades or in the joints, especially if rheumatism has preceded the disease.

True angina pectoris occurs more frequently in this than in any other form of valvular disease. In some cases there is marked dilatation of the peripheral vessels, which is accompanied by hot flashes and profuse and exhausting sweats, especially where there has been much disturbance of the pulmonary circulation attended by cough and hemorrhage. These cases have been in some instances mistaken for phthisis.

As the disease progresses and there is failure of compensation, all the symptoms already named are aggravated, and new phases develop. The pulmonary circulation is retarded, engorgement of the lungs follows, respiration is difficult, and cough follows with frequent hemorrhage.

The dyspnea is now a marked feature, and is quite distressing on slight exertion. As night approaches, the breathing seems to be more labored, and the patient, partly through fear and partly from a sense of suffocation, is compelled to pass the night in a chair, not being able to lie down. If there is any mitral disturbance, cyanosis becomes marked, the dyspnea becomes more severe, and dropsy develops, especially of the extremities.

The patient becomes quite anemic, which may partly account for the edema of the extremities. To add to the gravity of the case, a recurring endocarditis not infrequently develops, and would be recognized by the prostration and irregular fever developed.

Symptoms of cerebral, renal, or splenic embolism may arise, and would be recognized by paralysis, renal hemorrhage, and pain in the spleen, with more or less enlargement of the organ.

There seems to be a close relation between mental disturbances and cardiac lesions. These patients not infrequently become nervous and irritable, or melancholic and depressed. Insanity may develop towards the final termination of the disease, with suicidal tendencies, and the patient should be constantly watched after the first appearance of mental disorder.

Physical Signs.—*Inspection* will reveal a wide and extreme apex beat. This is most marked between the sixth and seventh interspace, and may extend to the anterior axillary line. In children there may be bulging of the precordia. Throbbing of the carotids may be noticed where the pulmonary circulation is disturbed; in fact, the temporal, brachial, and superficial vessels generally, may be seen to pulsate.

Palpation.—If the dilatation is not extensive, a heaving, forcible impulse is felt; but should the dilatation be extreme or the stage of compensation be passed, the impulse is weak and uncertain.

The pulse is characteristic, and was first described by Corrigan, and is often called the "Corrigan" pulse, the water-hammer pulse, the collapsing pulse. It is quick or jerking, and strikes the finger with force, but immediately recedes or collapses. The capillary pulse is frequently seen in aortic insufficiency, and may be noticed by brisk friction on the forehead, after which the hyperemic spot alternately blushes and turns pale.

FIGURE 19. TRACINGS OF PULSE AORTIC REGURGITATION.—(Tyson.)

Percussion.—There is a greater extent of dullness in this than in any other valvular lesion, and extends as low as the eighth interspace, and to the left as far as the anterior axillary line. When the left auricle is hypertrophied, it extends upward and to the left of the sternum. If the right heart has shared in the changes, the dullness extends to the right of the sternum.

Auscultation.—The most characteristic murmur of aortic insufficiency is a prolonged, soft, and somewhat musical or loud murmur, occurring during diastole, and is heard most distinctly in the intercostal space to the left of the sternum or beneath the lower portion of the sternum, extending to the third interspace on the left. It is due to regurgitation of blood from the aorta back into the left ventricle, and is heard with the second heart-sound.

It is heard over a greater distance than any other murmur,

and may extend from the lower portion of the sternum to the spinal column. In extreme cases, this murmur may be heard in the carotids, and even in the radials. In many cases there is associated with this bruit a systolic murmur, heard over the aorta, but is shorter and more harsh, and is transmitted upwards to the neck. This sound is due to the roughened condition of the sclerotic change in the aorta, and is heard during the first heart-sound. It is more pronounced over the apex, though it may be transmitted to the arteries of the neck.

In addition to these murmurs, where the mitral orifice is dilated and there is relative insufficiency of the valves, there is a second murmur at the apex, which is most likely produced at the mitral orifice, and is known as the Flint murmur, Austin Flint having called attention to it. This somewhat rumbling sound is usually presystolic, and is no doubt due to the inability of the mitral valve to close the orifice, and as a result, the valve vibrates irregularly between the cross current of blood caused by the backward flow from the ventricle, meeting the forward rush from the auricle. Sometimes a double murmur may be heard in the carotids and subclavians, and occurs at the second sound.

Diagnosis.—That many cases are only recognized during an autopsy might lead one to believe that a diagnosis of the true condition is quite difficult; however, if proper care be made in the physical examination, and the progressive changes that take place be kept in mind, the diagnosis is usually not difficult. In no other valvular derangement do we find so great a hypertrophy of the left ventricle, and such extensive dullness downwards and to the left.

Then the diastolic regurgitant murmur, prolonged, soft, and somewhat musical, is the most characteristic and appreciable of all valvular murmurs, and is heard during the second sound. The characteristic water-hammer, or Corrigan pulse, together with the throbbing carotids and temporal arteries, and the alternate blushing and pallor of the capillaries when the cutaneous surface is rubbed,—all these make the diagnosis comparatively easy. When the lesion is unattended by a bruit, and when other valvular lesions prevail, the diagnosis becomes more difficult, and sometimes impossible.

Prognosis.—Aortic insufficiency does not necessarily mean an early death, and though we may not be able to effect a radical cure, the patient may be made to enjoy life. When the disease comes on insidiously, the compensatory changes enable the heart to do its work satisfactorily, and as long as hypertrophy equals the valvular derangement, the health is maintained and the patient may even follow quite an active life. With proper instructions as to habits of life and the avoidance of severe physical exertion, the patient may live the allotted time of life. When due to aortic sclerosis, and when atheromatous deposits have taken place, the prognosis is not favorable.

AORTIC STENOSIS.

Definition.—Aortic stenosis is an obstruction at the aortic orifice, due to changes in the segments of the semilunar valves, or arterio-sclerosis, or atheromatous deposits. Simple aortic stenosis is very rare, and is nearly always associated with more or less insufficiency.

Etiology.—The stenosis is usually due to a gradual sclerosis of the aortic valves, and this in turn by calcification. These sclerotic changes generally begin in the arch of the aorta and descend to the valves. Occasionally the thickening of the segments may be due to endocarditis, induced by rheumatism. This occurs more frequently in young subjects, older people being more prone to sclerotic changes.

The aorta may undergo these same changes, the leaflets remaining unaffected, though usually both are involved. The rigid and sometimes calcified leaflets narrow the opening, giving rise to stenosis of various grades and forms. Thus adhesions of the edges of the valves may form a funnel-shaped opening or "buttonhole" slit. The condition is sometimes congenital.

Pathology.—In addition to the changed condition of the valves and orifices, certain compensatory changes take place. To impel the volume of blood received from the auricle through the constricted aortic opening, requires increased power from the left ventricle, and, as a result of this increased work, a gradual hypertrophy follows. As long as compensation is maintained—and in some cases it is to the end—there is no further change in

the heart. Finally, however, owing to the great ventricular tension, sclerotic changes occur in the mitral valve, and, compensation giving way, dilatation follows.

Sclerotic changes having already occurred in the mitral valve, mitral insufficiency follows; as a result, there is auricular dilatation, obstructed pulmonary circulation, and increased work is required, with its consequent changes of the right heart.

There is not the marked arterial changes in stenosis as in insufficiency, for the arterial walls do not receive so strong a volume after each systole; in fact, if the stenosis is extreme, a smaller amount than normal flows through the arteries. If compensation is well maintained, however, the pulse will remain normal.

Symptoms.—Since the hypertrophy of the left ventricle keeps pace with the stenosis, there may be few or no subjective symptoms for years, and the patient dies of some other affection, the heart lesion being discovered during an autopsy. As soon as compensation ceases, however, the lesion shows some of the characteristic symptoms. The left ventricle, unable to throw the proper volume of blood, anemia of the brain and peripheral parts of the body occur. This is announced by dizziness, headache, marked pallor, and sometimes fainting.

These symptoms appear upon slight exertion or undue mental disturbance. With the loss of compensation also comes a disturbance of the pulmonary circulation, which is attended by cough, embarrassed respiration, and sometimes by hemoptysis. With the general systemic circulation impaired, dropsy is frequently seen, though usually confined to the extremities.

In some cases warty or cauliflower excrescences are deposited on the valves, and these, becoming loose, float off into the bloodstream, and are conveyed to the brain, kidneys, spleen, and other organs, and give rise to embolism of these organs.

Local symptoms would suggest the organ or organs affected. The pulse is usually small, easily compressed, and does not correspond to the ventricular impulse. In some cases it is irregular or intermittent.

Physical Signs.—*Inspection.*—The information gained by inspection depends upon the stage of the disease. Thus, before compensation fails, the apex beat is gradually displaced downwards, and is heaving and forceful, not nearly so pronounced,

however, as in aortic insufficiency. After compensation fails, the impulse is feeble. In old people, where the chest-walls are firm and unresisting, the apex beat is not seen at any stage.

Palpation.—Unless emphysema be present, palpation reveals a characteristic systolic thrill more pronounced than in any other cardiac lesion, and is heard at the base of the heart and at the second intercostal space. The cardiac impulse is usually strong and heaving, though the apex beat may be imperceptible if pulmonary emphysema be present.

Percussion.—The condition of the lungs determines largely, the extent of dullness; for though there is marked hypertrophy of the left ventricle, if emphysema be present, but little increase in dullness will be noticed. If not present, the dullness will be increased downwards and to the left. When compensation fails, and the rest of the heart suffers changes, the dullness is materially increased.



FIGURE 20. PULSE-TRACING OF AORTIC STENOSIS.—
ANACROTIC CURVE.—(Tyson.)

Auscultation.—A pronounced harsh, systolic murmur, sometimes musical in character, is heard with greatest intensity over the aortic cartilage, the second right intercostal space, and is transmitted to the great vessels of the neck. We are to remember, however, that the roughened aortic valves, and the sclerotic changes of the intima of the aorta, may give rise to the same sound.

If compensation has failed, and there is marked dilatation, the murmur becomes soft and indistinct. The second sound is weak, and may not be recognizable, owing to diminished blood-pressure in the aorta and the inability of the thickened valves to quickly close the orifice. As there is nearly always present aortic insufficiency, a diastolic or regurgitant murmur is associated with the aortic, giving rise to a double bruit.

Dickenson speaks of a musical murmur heard with greatest intensity in the apex region, and due most likely to regurgitation, through the altered mitral valves.

Diagnosis.—If the patient be advanced in years, and a loud, rough, or musical systolic murmur be heard at the aortic cartilage, the second right intercostal, and transmitted to the large vessels of the neck, and if there be evidence of hypertrophy of the left ventricle, and a systolic thrill most marked at the base, with a small, quick, and sometimes irregular pulse, the diagnosis of aortic stenosis would most likely be correct.

The loud, harsh, roughened sound, not musical, that accompanies sclerotic valves, however, may be mistaken for aortic stenosis, though this murmur is not so likely to obscure the second cardiac sound as where there is stenosis. In some cases of chronic Bright's disease with ventricular hypertrophy due to aortic sclerosis, a murmur may be developed whose maximum intensity is heard over the base; the intensification of the second sound, however, together with the characteristic urinary symptoms, should enable the examiner to make a proper differentiation. We have basic murmurs in anemia, but here the systolic thrill is absent, and also hypertrophy of the left ventricle.

MITRAL INCOMPETENCY.

Synonyms.—Mitral Regurgitation; Mitral Insufficiency.

Definition.—Mitral incompetency is an imperfect closure of the auriculo-ventricular opening, permitting a regurgitation of blood during the contraction of the left ventricle, and due to an abnormal condition of the leaflets or to an enlarged opening.

Etiology.—The most frequent cause leading to change in the mitral valves, whereby the leaflets become adherent, thickened, or curled, is rheumatic endocarditis, though these same changes may occur from endocarditis due to other causes. Disease of the chordæ tendineæ, whereby they are forcibly contracted, or become weakened, permitting them to dip into the orifice, may give rise to insufficiency.

Alcohol and syphilis are not to be overlooked as factors producing sclerotic changes in the mitral valve. Aortic valvular changes may give rise to mitral insufficiency, through increased tension of the blood in the left ventricle.

Dilatation of the left ventricle may give rise to enlargement of the mitral orifice, the leaflets remaining whole; the insuffi-

ciency here being relative. Incompetency also may be due to ulcerative endocarditis from the infectious fevers, in which case there may be perforation of the leaflets.

Degeneration of the muscular walls of the ventricle, either by causing such extensive dilatation as to prevent a closure of the orifice, or to so affect the muscular substance as to prevent a proper coaptation of the leaflets during the systole, will give rise to muscular incompetency. Long continued, severe physical training or extraordinary physical exertion may give rise to it.

Pathology.—The changes that are found in this, the most frequent of all valvular lesions, are varied. There will be thickening in some cases, with curling of the leaflets, while in others there will be adhesions of the segments; in another, nodulation or perforation may be seen. In some there is a change in the chordæ tendineæ, such as undue contraction; or the opposite condition prevails, and there is relaxation. In rare cases there is a rupture of the chordæ tendineæ.

Adhesions of one or both segments to the wall of the ventricle have also been found. As a result of the inability of the mitral valves to effectually close the mitral opening following the auricular systole, there is a regurgitation of blood into the left auricle, which meets the stream coming from the pulmonary veins; as a result, there is an increased amount of blood in the auricle which causes its dilatation. In order to expel this abnormal amount, increased work is thrown upon it, which causes hypertrophy as well. This increased volume of blood in the auricle impairs the pulmonary circulation, and the lungs become engorged.

With each contraction of the left auricle an increased quantity of blood is emptied into the left ventricle, causing dilatation and hypertrophy of the same. As a result of the pulmonary congestion, the right ventricle is not able to completely empty its contents; hence dilatation, followed in turn by hypertrophy of the right heart, takes place. Finally the right auricle passes through the same compensatory changes of dilatation and hypertrophy.

These compensatory changes take place so gradually that the patient may enjoy good health for years; for the hypertrophied heart throws the normal amount of blood into the aorta and general circulation. Finally, however, the incompetency becomes extreme, or compensation fails, and the left ventricle is unable to properly empty itself, and, as a result, the auricle becomes

greatly distended, the pulmonary circulation engorged, the right heart embarrassed, and the systemic veins congested. The result of this pulmonary engorgement causes dilatation of both arteries, and degeneration and atheromatous deposits are not uncommon.

After all this disturbance, the right ventricle heroically does its increased work, and the patient may live for months with embarrassed respiration, cough, and evidences of respiratory lesions; but ultimately the right ventricle is unequal to the task, there is aggravated insufficiency of the tricuspid valves, and general systemic congestion.

The portal circulation is affected, cerebral engorgement follows, cyanosis becomes marked, and the extremities become edematous. Cyanotic induration of liver, spleen, and other viscera takes place.

Symptoms.—Nature comes to the patient's rescue, and, by gradual and progressive changes, so fortifies the cardiac structure that a patient may live for years without the knowledge of a valvular lesion. As long as the hypertrophied ventricles are able to meet the demands made upon them, the patient suffers no inconvenience, save an embarrassed respiration after active exertion, such as going up stairs, climbing a hill, running for a car, or the many seeming necessities of every-day life.

Finally the earlier and minor symptoms develop, even while compensation remains good, and are prophetic of later changes. The face becomes slightly flushed, the lips and ears become blue, and the veins of the cheeks become slightly enlarged. Slight exertion now gives rise to dyspnea and cough, the expectoration often being tinged with blood; palpitation of the heart, with precordial pain, is also often present. The disturbed respiration, the cough, the bloody, frothy sputum, may deceive both patient and physician unless a physical examination be made.

As the disease progresses, there finally comes a period when compensation is disturbed and more pronounced symptoms appear. Venous engorgement is the first evidence of this disturbed condition, and is shown in the increased cyanosis. The skin is not only cyanotic, but also jaundiced, induced by engorgement of the liver.

The dyspnea now becomes marked, owing to pulmonary congestion, and the patient's distress is apparent. This is especially

so when the patient attempts to sleep, as he suddenly awakens with a sense of suffocation and a feeling as though the heart was going to stop its work. Cough is now a prominent symptom, and the patient expectorates a frothy, bloody serum. Dropsical effusion begins first in the feet, gradually extending up the limbs, finally resulting in general anasarca.

The position of the patient is now upright, and he occupies his chair day and night. The liver and spleen become engorged; there is often gastric irritation, with catarrh of the stomach and intestines. The urine is very scanty, highly colored, albuminous, and contains tube casts; sometimes but four or six ounces of chalky, bloody urine is passed in twenty-four hours.

The patient does not often suffer acute pain, the distress mostly arising from dyspnea and his inability to lie down and obtain a good night's rest. Sudden death is a rare termination of this form of heart disease.

Physical Signs.—*Inspection.*—The apex beat is seen to be displaced downward and to the left, depending upon the extent of enlargement of the left ventricle. It may be seen as low as the sixth interspace near the axillary line. In children the precordia is prominent, even budging, the area of the apex beat is enlarged, and, in the latter stages, is diffuse and waving.

After the right ventricle becomes dilated, we often notice epigastric pulsation. Wavy pulsations in the cervical veins also follow extreme dilatation of the right heart. As compensation fails, the lips and ears become dark and general cyanosis appears.

Palpation.—By placing the hand flat over the precordium, a systolic thrill may be felt over the apex, though this is by no means constant. It is synchronous with the first sound. The apex beat is displaced downwards and to the left, and is full and strong during the period of compensation, but with its disturbance, becomes irregular, and, later, waving and feeble.

By placing the hand over the epigastrium, after extreme dilatation of the right ventricle, epigastric pulsation is observed. The pulse is but little, if any, changed during the period of compensation, though exertion may give rise to some irregularity. When compensation fails, it loses its impulse and becomes irregular.

Percussion.—Owing to hypertrophy of both left and right ventricles, there is a greater area of dullness in a transverse di-

recession in mitral lesions than in any other valvular disease. It may extend from an inch or more, to the right anterior axillary line. A slight increase in dullness upward along the border of the sternum is due to hypertrophy of the left auricle.

Auscultation.—The most constant and characteristic sign of regurgitation heard on auscultation is the mitral or systolic murmur, which is heard over the apex and partly, or entirely, replaces the first sound. It is of a blowing character, sometimes terminating in a musical tone, and is transmitted to the axilla, and may be heard at the angle of the scapula; in fact, if the contraction be strong, it may be heard all over the chest.

If the contraction be weak, the murmur may be heard over the base of the heart when inaudible elsewhere. Sometimes, by changing from the erect to the recumbent position, the murmur may be heard. At times there may be heard a soft, blowing, presystolic murmur.



FIGURE 21. TRACING OF PULSE OF MITRAL INSUFFICIENCY.—(*Tyson.*)

Another very important sign is due to hypertrophy of the right ventricle, which causes an increased tension in the pulmonary vessels, that gives rise to the accentuated pulmonic second sound, and is heard over the third left costal cartilage.

Where there is extreme dilatation, and especially if dropsy be present, there can be heard a soft, low-pitched, systolic murmur at the ensiform cartilage and at the lower sternal region, and is due to tricuspid insufficiency. Combined murmurs may be heard of a rough or harsh character, though they are not constant.

Diagnosis.—The diagnosis of mitral insufficiency is generally comparatively easy, if we bear in mind the *three* characteristic signs:

First, a systolic murmur obliterating the first sound. It is of a blowing character, terminating in a musical note and heard with maximum intensity over the *apex*, but also transmitted to the axilla and back.

Second, accentuation of the pulmonary second sound, heard over the *third* costal cartilage.

Third, the increased *transverse* dullness extending from an inch or more to the right of the sternum to the left axillary line.

Add to these, blueness of the ears, nose, and lips, dyspnea, and more or less cough, and the picture is complete.

There are two other forms of valvular disease that may be mistaken for mitral insufficiency, since each is accompanied by a systolic murmur—*aortic stenosis* and *tricuspid incompetency*. In aortic stenosis the sound is harsh, and heard best over the base of the heart, while in mitral insufficiency it is heard at the apex.

In aortic stenosis, the area of dullness is but little increased, and that to the left, while the area of dullness in mitral insufficiency is more extensive than any other lesion. The tricuspid systolic murmur is soft and low, and heard with greatest intensity at the *base* of the ensiform cartilage.

MITRAL STENOSIS.

Definition.—Mitral stenosis is a constriction of the left auriculo-ventricular orifice, usually due to valvular endocarditis, though it may be congenital.

Etiology.—Any cause that will give rise to endocarditis should be considered a producing factor of mitral stenosis; sub-acute rheumatism being responsible for the largest per cent of cases, though chorea and chlorosis are responsible for many, and most likely explains the greater frequency of the disease in females—about four to one.

The infectious fevers, especially measles, scarlet fever, and diphtheria, are also causal factors, while whooping-cough, no doubt, gives rise to valvular lesions from the straining of the valves induced by severe paroxysms of coughing.

It is a disease of early and middle life, rarely occurring after the age of fifty. Stenosis may be due to infiltration of the valvular ring, the valves remaining normal, though this is very rare.

Congenital stenosis has been noted, but is of very rare occurrence.

Pathology.—The morbid changes that take place in the valves, give rise, in most cases, to narrowing of the orifice. These

changes consist in thickening and rigidity of the segments, and chordæ tendineæ, and frequently a fusion of the segments at their edges; not infrequently there are calcareous deposits. These changes convert the valves into a funnel, the base extending into the ventricle.

The degree of stenosis and shape varies. In one it will be circular, and so small as to scarcely admit a goose-quill, while in another it will be flattened, giving rise to a small, narrow slit—the “buttonhole” mitral. The funnel-shaped opening is usually found in young subjects, and rarely in old patients, while the buttonhole slit is rarely found in the young, and nearly always in elderly patients.

Sometimes there will be vegetations upon the valves, obstructing the flow of blood, and in this way the size of the opening is reduced. In nearly all of these cases there will be more or less insufficiency as well as stenosis.

The changes in the heart are as follows: Owing to the diminished opening, less blood is forced into the left ventricle, and, as a result, the ventricle atrophies, the atrophic changes at times extending into the aorta. As a result of the stenosis, the auricle is not completely emptied, hence dilatation, and, later, hypertrophy follows, thus enabling the auricle to expel the blood through the small orifice; later, there is thinning of the walls.

This dilatation and hypertrophy necessarily call for increased work from the pulmonary vessels, which, in turn, become more or less thickened. The lungs become congested, and this constant tension in the lesser circulation is followed by induration of lung-tissue, sclerosis of the vessels, and sometimes by hemorrhagic infarcts. Pepper speaks of a case where atheromatous deposits in the pulmonary vessels were found to their remotest branches, the left lung being almost solid and airless.

The hypertrophy of the left auricle, for a time, compensates for the great resistance at the mitral orifice, and the patient suffers but little. Sooner or later, however, the auricle can not maintain this equilibrium, congestion of the lungs becomes more marked, and the right heart comes to the relief by taking on dilatation and hypertrophy, which aids the parts already enlarged for compensatory efforts, and the patient's life is still further prolonged, finally, however, the dilatation increases, the tricuspid valves are unable to effect a perfect closure, and tricuspid in-

sufficiency is the result, with congestion of the general circulation and that cyanotic condition prophetic of a fatal issue.

When the stenosis is only moderate and there is mitral incompetency as well, there will be slight hypertrophy of the left ventricle. The apex of the heart is made up almost entirely of the hypertrophied right ventricle.

Symptoms.—The subjective symptoms during the stage of compensation are few and unreliable and may be entirely absent; when present, they are due to emotional excitement or physical exertion, such as going upstairs or performing some unusual muscular effort. The symptoms developed are the result of pulmonary congestion, and consist of dyspnea and cough, attended, at first, by expectoration of frothy mucus, which becomes blood-stained later on.

In the early stage, before compensation gives way, there is evidence of a defective blood-supply to the brain, which is seen in the pallor of the face and mucous membranes. Owing to the small amount of blood thrown into the left ventricle, the pulse becomes small, frequent, and irregular. A sharp stitchlike pain is frequently present in the apex region, and undue exertion may be attended by hemoptysis.

After compensation gives way, the symptoms become quite pronounced, and are almost identical with those of mitral insufficiency, for in a large number of cases the lesion is a combined one. Owing to pulmonary obstruction, the dyspnea becomes constant, and is greatly exaggerated on exertion. The face now becomes dusky, and the veins of the neck are distended and pulsation is visible. The liver becomes swollen, with thickening of the bile-ducts, causing jaundice, more or less pronounced. The urine becomes scanty, high-colored, and contains albumen. Dropsical effusion begins in the feet, rapidly extending up the limbs to the body, general dropsy resulting.

If vegetative deposits become loosened, they may float off into the general current, and give rise to embolism of the brain, kidney, or spleen, in which case local symptoms would determine the seat of disturbance.

Physical Signs.—*Inspection.*—If there be exaggerated hypertrophy of the right ventricle, there will be undue prominence, especially in children, over the lower half of the sternum and the

fifth and sixth costal cartilages, otherwise the chest remains normal. The apex beat may be seen in the normal position, though chiefly over the lower sternum and adjacent cartilage.

Increased tension of the pulmonary artery will frequently be shown by a visible pulsation in the second, and sometimes the third and fourth, intercostal spaces. Epigastric pulsation is seen when there is great congestion of the liver. When compensation fails, the impulse of the heart becomes weak, and sometimes can not be seen, though pulsation may be seen in the enlarged veins of the neck.

Palpation.—A presystolic thrill, harsh or grating in character, and terminating in a sudden shock, synchronous with the pulse, is pathognomonic of mitral stenosis. It is best heard during expiration, and over the third and fourth interspaces. When absent, it may be made to appear by rapidly clapping the hands over the head.

The apex beat is felt more forcibly over the lower sternum and over the third and fourth interspaces. Epigastric pulsation is often pronounced, especially when there is enlargement of the liver. The pulse, owing to the weak impulse of the left ventricle, is small though regular during the period of compensation. When compensation fails, the pulse becomes irregular.

Percussion.—Where there is excessive hypertrophy of the right ventricle dullness may extend to the right nipple line. If the left auricle be greatly dilated, there will be extension of dullness to the left of the sternum as high as the second rib. Where there is marked pulmonary engorgement, there may be dullness over the entire left lung, and, if care be not exercised, it may be mistaken for consolidation of phthisis. Increase in transverse dullness will suggest an associated hypertrophy of the left ventricle.

Auscultation.—In well-marked cases a presystolic murmur, prolonged and of a harsh, rumbling character, may be heard within and above the normal apex beat. The area is quite limited, and, when compensation fails, may disappear entirely. If palpation be practiced at the same time, the murmur and thrill will be found to be synchronous. The murmur terminates suddenly with a distinct shock.

The first sound, sharp and distinct, following immediately after the rumbling sound, is another characteristic symptom, and

is probably due to the sudden closure of the tricuspid valve, induced by hypertrophy of the right ventricle. This sound may be present when the murmur has not been heard, or when it has disappeared. The second sound at the pulmonic cartilage is of a sharp, ringing character. These adventitious sounds are more distinct and readily heard before failure of compensation, and are of great value in determining the valvular lesion.

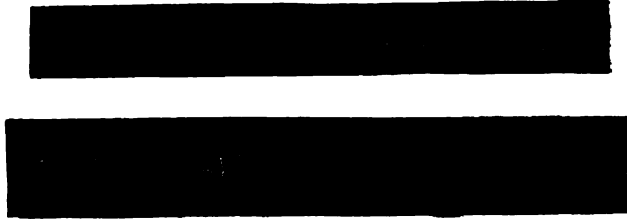


FIGURE 22. TRACINGS OF PULSE OF MITRAL STENOSIS.—(*Tyson.*)

After compensation fails, there is such a confusion of sounds that but little knowledge is obtained from them.

Diagnosis.—The characteristic features that point to mitral stenosis are, first, a presystolic murmur, prolonged, harsh, and rumbling, heard above yet near the apex; second, a presystolic thrill at the apex, synchronous with the murmur; third, the sharp, ringing character of the pulmonic sound; fourth, the increased dullness extending to the right of the sternum; fifth, the small, regular pulse before compensation, followed by a small, irregular pulse after compensation; sixth, wavy pulsations of the veins of the neck.

TRICUSPID INCOMPETENCY.

Synonym.—Tricuspid Regurgitation.

Definition.—Tricuspid incompetency is an imperfect closure of the tricuspid valves, due to dilatation of the right ventricle or to disease of the valves.

Etiology.—While tricuspid insufficiency may be the result of organic valvular lesion, it occurs far more frequently as the result of dilatation and is relative. Actual disease of the valves may result from fetal endocarditis. Notwithstanding the rarity

of sclerosis in the valve segments, Bramwell's statistics show that fifty per cent of all cases of endocarditis are attended by tricuspid insufficiency.

It is far more common in children, and decreases with advancing years. It is generally due to mitral disease. Obstruction to the pulmonary circulation, due to chronic bronchitis, when associated with emphysema and tuberculosis of the lung or fibroid pneumonia, is a frequent cause.

Pathology.—As a result of the failure of the tricuspid valves to close the auriculo-ventricular opening, there is regurgitation into the auricle, which, meeting the great mass of blood from the venæ cavæ, causes congestion and enlargement of the entire venous system. Having no assistance from a fellow-member, as the left heart has, in its many efforts to overcome increased work, there can be but little compensatory changes.

The right ventricle undergoes slight hypertrophy, and, for a time the pulmonary circulation is fairly maintained; but the quantity of blood from the right auricle, being abnormally large, the right ventricle becomes enormously dilated, which causes thinning of its walls. As this progresses, its power becomes feeble, and, not being able to force the blood through the pulmonary artery, the right auricle, the venæ cavæ, and even the peripheral veins, become greatly dilated, cyanosis is marked, and the case ends fatally.

Symptoms.—The early symptoms are generally obscured by the primary lesion. If this lesion be the result of mitral insufficiency, the symptoms accompanying it will be present long before those relating to changes of the right heart, or, if due to wrongs of the respiratory apparatus, the symptoms due to chronic bronchitis or pulmonary lesion will mask those relating directly to the tricuspid incompetency.

When fully developed, however, they become characteristic, and are suggestive of passive congestion of the lungs and marked engorgement of the systemic veins. Dyspnea at first, after slight exertion, soon becomes more or less constant. There is frequent cough and sometimes hemorrhage from the lungs. The pulse is small and irregular. Dizziness, with dull headache, may be attributed to passive hyperemia of the brain.

There is disturbance of the gastro-intestinal functions owing

to engorgement of their structures, while the liver is found to be enlarged and indurated. The spleen shares in the general congestion, and a sense of weight and fullness is experienced in the left hypochondrium. The urine is scanty, high-colored, and contains albumen.

Physical Signs.—*Inspection.*—If the tricuspid insufficiency has been preceded by mitral regurgitation, the apex beat will be seen in the normal position or slightly to the right, owing to the increased hypertrophy of the right ventricle. Epigastric pulsation, with bulging of the lower sternal region, is not uncommon.

The most characteristic and pathognomonic sign is the visible pulsations of the veins of the neck with each cardiac systole; the lower portion of the jugulars first, and later in the disease throughout their entire course. It may also be seen in the subclavian, axillary, thyroid, and mammary veins in advanced cases. To bring this out more distinctly, the patient should be requested to hold the breath a few seconds before taking a full respiration.

Palpation.—If, when the patient lies on the back with the arms raised, we place the left hand over the right mid-axillary region, and the right hand over the upper abdominal region, we get an expansile pulsation of the liver synchronous with that of the right ventricle. A systolic thrill may sometimes be felt over the right ventricle.

The pulse depends to a great extent upon valvular lesions of the left heart which have preceded the tricuspid changes, though in most cases it is frequent, feeble, and irregular. Popoff has called attention to the greater weakness of the pulse of the right wrist, due to pressure on the innominate artery by the enlarged right auricle and venæ cavæ.

Percussion.—Percussion reveals dullness extending an inch or more to the right of the sternum and downwards toward the epigastrium. It may also extend to the second interspace.

Auscultation.—A systolic murmur, soft and low in character, is usually heard at the lower part of the sternum near the ensiform cartilage, though not always, if the heart be weak. There is accentuation of the pulmonic second sound in the early stage, but as the incompetency increases, it loses its sharpness, and may finally disappear.

To the skilled ear, auscultation of the lower part of the jugu-

lar vein may reveal a venous sound, due to the closure of the valve at this point. This is before the valve becomes insufficient.

Diagnosis.—The venous pulse is the most significant of all physical signs, either as seen in the neck or observed by palpating the liver. If with this, we detect a systolic murmur, whose maximum intensity is heard over the lower sternum, and percussion reveals dullness to the right of the sternum, the diagnosis is complete.

TRICUSPID STENOSIS.

Definition.—Tricuspid stenosis is an obstruction of the tricuspid opening, usually congenital, though it may be acquired.

Etiology.—This is the rarest of all heart-lesions and one that is generally congenital. It is also rarely, if ever, found as an independent disease, being usually associated with disease of the left heart. In these combined forms, rheumatism has been found to be a causal factor. It is very much more frequent in females than in males; thus of 114 cases recorded by Leudet, 80 per cent were found in females, while of 46 cases reported by Fenwick, 38 were in women.

The frequency with which the disease is found with other valve lesions may be seen by referring to Leudet's classification of 114 cases. Thus in 11 cases, the tricuspid valve was alone involved, the tricuspid, mitral, and aortic valves in 21 cases; while the tricuspid and mitral valves were found involved in 78 cases.

Pathology.—The valves may be thickened with a partial fusion of the segments. The other morbid changes are necessarily about the same as are found in mitral stenosis and tricuspid insufficiency. There can be only one result from such obstruction; namely, dilatation of the right auricle, with engorgement of the venous system, disturbing the various viscera. The right ventricle hypertrophies, owing to increased tension in the pulmonary circulation, through mitral stenosis.

Symptoms.—The general symptoms are those of venous engorgement, and are similar to those of tricuspid insufficiency. Hemorrhoids, enlargement of the liver, and cerebral congestion follow of necessity, with dropsy following as the engorgement increases.

Physical Signs.—*Inspection.*—Slight presystolic pulsation is seen in the jugulars and general cyanosis is pronounced.

Palpation.—Over the right ventricle may be noticed a presystolic thrill.

Percussion.—Dullness extending to the right of the sternum, due to the enlarged auricle, will be found to be characteristic.

Auscultation.—A presystolic murmur may be heard over the lower part of the sternum, terminating in a sharp first sound, if the case be uncomplicated; but in the very great number of cases there is such a confusion and combination of murmurs owing to the various complications, that there can not be said to be any characteristic murmurs.

Diagnosis.—Owing to the complications or associated valvular lesions, the differential diagnosis between stenosis and insufficiency is almost impossible.

PULMONARY INCOMPETENCY.

Synonym.—Pulmonary Insufficiency.

Definition.—Pulmonary incompetency is an imperfect closure of the pulmonary orifice of the right ventricle, due to a change in the pulmonary valves.

Etiology.—The disease is rare and usually congenital, though it may result from endocarditis, followed by similar changes that take place in other valvular diseases due to the same source; namely, sclerosis and adhesion of the segments.

Pathology.—In addition to thickening of the valves or partial union of the segments, we have hypertrophy and dilatation of the right ventricle, which, in turn, is followed by tricuspid insufficiency.

Symptoms.—There are no general symptoms that are characteristic, and the physical signs are not reliable. Although a diastolic murmur may be heard in the second right intercostal space and transmitted to the lower sternal region, it is difficult, if not impossible, to separate this from the murmur of aortic regurgitation.

Diagnosis.—The diagnosis is generally made during an autopsy.

PULMONARY STENOSIS.

Definition.—Pulmonary stenosis is an obstruction of the pulmonary opening of the right ventricle, due to congenital defects or to endocarditis.

Etiology.—The narrowing of the pulmonary orifice is generally due to congenital malformation, though endocarditis after birth may occasionally give rise to it.

Pathology.—There is generally fusion of the valve segments, leaving but a small opening, the valves not infrequently being covered with vegetations. Hypertrophy of the right ventricle naturally follows, to compensate the closure and maintain the pulmonary circulation.

Symptoms.—As in pulmonary insufficiency, the general symptoms are obscure and the physical signs uncertain. A systolic murmur, attended with a thrill, may be heard in the second right intercostal space to the left of the sternum. Other pulmonic murmurs, however, are to be heard, and the distinction is often not clear. The murmur of aortic stenosis, however, may be excluded, for it is transmitted to the cervical vessels, while the afore-said systolic murmur is not.

Diagnosis.—As in pulmonary insufficiency, a positive diagnosis can only be made post-mortem.

COMBINED VALVULAR LESIONS.

In the majority of all cases of valvular diseases, combined murmurs or lesions occur after a few months or years. When a valve or orifice becomes affected, increased work is thrown upon some other part, and this naturally brings about additional changes. There may be a double lesion of a single valve, as stenosis and insufficiency; or there may be a single or double lesion of two or more valves. The combination most frequently found is mitral regurgitation with aortic regurgitation and obstruction. Mitral stenosis with regurgitation comes next in order, other combinations being of rarer occurrence.

Many of these combinations are compensatory in character, and really prove beneficial to the patient, being the only way nature has of coming to the rescue and preventing a fatal issue.

A positive ante-mortem diagnosis is many times impossible, owing to a combination of murmurs and thrills, though generally some one murmur is more prominent and distinct, directing attention to the chief lesion, and associated murmurs will suggest the additional wrongs.

The state of the auricles and ventricles will be determined by the amount of hypertrophy and dilatation.

Prognosis in Chronic Valvular Diseases.—In making a prognosis, several factors are to be taken into consideration, such as age, sex, constitutional vices or defects, previous diseases, parts affected, etc., We are to remember that valvular diseases of the heart do not necessarily mean either a sudden or early death, many patients having lived to a good age and having died from some other disease, the cardiac lesion having been discovered during an autopsy.

When a patient is able to lead a quiet life, avoiding any severe exertion or strain upon the heart, and anything that would give rise to great emotional excitement, the valve lesion should not materially shorten life.

When the nutrition of the heart begins to fail and compensation is disturbed and overcome, the prognosis is unfavorable, as death occurs sooner or later.

Osler says: "When the apex beat is in the normal situation and the rhythm is regular, the auscultatory phenomena may be practically disregarded."

Valvular lesions in children are more unfavorable than when occurring later in life.

The fact that women do not lead such strenuous lives as men makes the prognosis more favorable for the fair sex.

Valves Affected.—Aortic insufficiency is the most serious, while mitral insufficiency is the most favorable.

Previous Diseases.—Infectious fevers, where they have been of a malignant character, predispose to more serious lesions, than where there has been an entire absence of infection. Acute rheumatism, followed by the chronic form, also makes the lesion more serious. Tuberculosis, Bright's disease, and kindred lesions also render the disease unfavorable.

Treatment of Valvular Lesions.—There is no class of diseases that needs a more careful study with reference to treat-

ment than chronic heart diseases. Recognizing some of the most prominent and common causes that lead to valvular lesion, the physician may, if thoughtful, either prevent or lessen their severity. Prophylaxis, then, will be first considered.

If there is a family history of heart disease, it is incumbent on the physician to outline a course of living that will not overtax the heart. While the patient should live in the open air and take well-directed exercise, any labor or exertion that would produce undue strain should be forbidden. The use of tobacco and alcohol should be absolutely restricted, and high altitudes avoided.

If rheumatism attacks such patients, great care should be taken during convalescence to prevent cold, and not overtax the heart. The patient should rest in bed for a week or two after all evidence of rheumatism has disappeared. The same precautions should be taken following the infectious fevers.

In the selection of medicines great care should be taken to select the right remedy. There is no better field for the display of specific medication than in heart troubles, and I think there can be little doubt that many cardiac affections have failed to recover because the right remedy was not selected.

Digitalis has been the David selected to slay this Goliath of disease, and he is marched to the front for all cardiac diseases. The remedy certainly is a good one in some cases, but to expect one remedy to act as a stimulant in one case, sedative in another, tonic in a third, and, in fact, correct every diseased condition the heart is subject to, is certainly asking too much of it. Yet the almost universal treatment as soon as a diagnosis has been made is *digitalis*. The selection of the right remedy will be determined somewhat upon the stage of the disease, whether it is the period of compensation or non-compensation.

Stage of Compensation.—Unless of a very nervous or excitable temperament, the patient should be made to understand his true condition, that he may the more readily carry out the restrictions placed upon him; namely, to avoid severe physical exertion and great mental excitement, and to abstain from the use of coffee, tea, spirits, and tobacco, to avoid overloading the stomach, and to observe regular habits.

In some cases there is excessive force or power of the heart, as shown by the full, bounding pulse. This excess in power, if

not overcome, will hasten the period of non-compensation, and should be controlled.

Veratrum acts nicely in such cases, but its action must be carefully watched and as soon as the pulse begins to come under its influence, lessen the dose. The indication is the full, bounding pulse.

Cratægus Oxyacantha.—This remedy has recently been very highly extolled in valvular troubles, some even claiming for the remedy wonderful solvent power in crustaceous and calcareous deposits on valves and in the lumen of arteries. While these claims no doubt are extravagant, it undoubtedly is a very good remedy in improving cardiac functions, and does lessen valvular deposits. It does not overstimulate, and thus is highly beneficial during this stage. It should be given in from three to ten drop doses.

Cactus, when given in the small dose, is also a good remedy during this period, assisting to maintain the tone of the organ. Care must be taken not to overstimulate the heart and thus hasten its exhaustion, which is followed by dilatation. Whatever remedy is used, too early results must not be expected, but the remedy should be given a fair trial.

The diet should receive special consideration. Nourishing but easily digested food should be taken in moderate quantities. Fluids should be restricted to the smallest quantity compatible with health.

Stage of Non-Compensation.—This stage is recognized by dyspnea, nocturnal seizures of shortness of breath, and irregular action of the heart. It is the evidence of heart exhaustion to be followed by dilatation. Perfect rest in bed is of absolute necessity, the patient occupying the recumbent position. This measure alone will prove greatly beneficial, and may for a short time restore compensation. The diet should be nutritious and highly concentrated, and given in liberal quantities. All excitement is to be avoided; hence unnecessary conversation should be prohibited.

Digitalis.—As a stimulant to the overburdened heart, digitalis will be found one of the best remedies. It rests the heart by prolonging the asystole, thus allowing the chambers to become better filled with blood. When dropsy is present, an infusion of

the leaves, one or two drams to eight ounces of boiling water, of which one tablespoonful may be given every two hours, will give speedy results. It adds tone to the heart, and at the same time stimulates the kidneys.

Cactus may also be used during this stage as a heart-tonic. *Convallaria* and *strophanthus* have a similar action to *digitalis*, and are not so apt to disturb the stomach.

Apocynum will be very useful when dropsy is present for it not only adds tone to the weakened heart, but stimulates the kidneys and bowels to increased action, thus relieving the distended blood-vessels. Under its administration the dyspnea is greatly relieved. Should rheumatism be present, the anti-rheumatics, *bryonia*, *macrotys*, *rhamnus*, *californica*, *apocynum*, etc., should be given according to indications.

Carduus Marianus is highly extolled by the homœopaths, especially where the liver is involved, and should be tested.

Gastric complications will be relieved by *nux vomica*, *rhus tox.*, bismuth, and mint-water, and by regulating the quantity of nourishment taken. The bowels should not be allowed to become constipated. Hepatic congestion may be somewhat relieved by *uedalia*, *leptandra*, *podophyllin*, and *carduus marianus*.

Should there be hemorrhage and expectoration, much relief may be experienced from it, and unless profuse, needs no attention. For the pain, which is sometimes very severe, *cratægus*, *echinacea*, and *bryonia* should be tried before resorting to *morphia*. When the patient is unable to sleep, *passiflora* may give the desired result, or trional in ten-grain doses may be given. The old diaphoretic powder, in five or ten-grain doses, often gives relief. When absolutely required, *morphia* may be given.

Should compensation be restored, the patient should be carefully watched and medicated for several months. In no case should the patient be allowed to undergo physical or mental strain. Light exercise in the open air, and a good liberal nourishing, but easily digested diet recommended. Change of climate to one, where there is the least call for expenditure of force, is to be advised.

CARDIAC THROMBOSIS.

Definition.—Cardiac Thrombosis is the formation of blood-clots in the cavities of the heart.

Etiology.—Though alteration in the integrity of the blood may have some influence in bringing about cardiac thrombi, the chief causes undoubtedly lie in a diseased endocardium, and may occur in acute or chronic disease of this membrane. It may be due to the obstruction of a free circulation by roughened valves or mural coat, thus furnishing a resting-place for fibrous deposits. The acute diseases, most liable to prove the exciting cause are, rheumatism, pneumonia, diphtheria, pyemia, and puerperal wrongs.

Pathology.—The blood-clots are found most frequently in the right side of the heart, in the auricular appendix more often than in the right ventricle. They vary in size, color, and consistency, and may be found from the size of a pinhead to that of a hen's-egg. If recent, they will be of a bright-red or reddish-brown color, and become gray or colorless as they age.

They are usually quite firmly attached to the endocardium by a sessile or pedunculated base, though the spherical or ball thrombi are free of attachments. They are firm in consistency in the earlier stages; but when degeneration takes place, softening follows, and sometimes particles become dislodged and float off to set up thrombi in other viscera. Calcareous degenerations have been noted.

They may occur singly or in groups. Thrombi have been known to project from one cavity into another, as from the left ventricle into the aorta.

Symptoms.—The symptoms are not very characteristic, and depend upon the size and rapidity of formation of the clot. The symptoms are those of obstructed circulation, the pulse being rapid and irregular, the apex-beat weak, and dyspnea more or less pronounced. Dizziness, vertigo, and attacks of syncope are common, and, later, cyanosis may appear.

In the advanced stage a clot may undergo necrosis, and blood-poisoning from absorption takes place. If a clot form suddenly and obstruct an orifice or coronary artery, sudden death results.

If the thrombi be in the right heart, and particles become dislodged, pulmonary embolism follows, with great dyspnea, pain,

and cough, with bloody expectoration. Should the emboli be in the left ventricle, and a portion become detached, it would be swept into the general circulation, giving rise to cerebral, renal, or splenic embolism.

The physical signs are not very pronounced. The pulse is irregular and the apex-beat faint. The heart sounds are usually very feeble. Percussion gives negative results.

Diagnosis.—A positive diagnosis can only be made post-mortem.

Prognosis.—The prognosis is always unfavorable, and sudden death may be anticipated.

Treatment.—The treatment will be altogether symptomatic.

HYPERTROPHY OF THE HEART.

Synonym.—Hypertrophica Cordis.

Definition.—Hypertrophy of the heart is an enlargement of the organ, due to an increase in the volume of its muscular fibers, and usually also to dilatation of its cavities.

Etiology.—Hypertrophy of the heart is governed by the same law that applies to all development; namely, that size, strength, and activity of an organ depend upon its power and continued use. *Increased* activity gives increased development, whether of the biceps, the lung, or the heart.

The causes giving rise to the necessity for increased work are many, but may be divided into three classes: (a) Those that give rise to ideopathic hypertrophy; (b) those due to changes in the heart itself; (c) abnormal condition of the arteries.

Primary Ideopathic Hypertrophy.—This may occur from prolonged or prodigious physical exertion, as witnessed in athletes, bridge-builders, iron-workers, blacksmiths, etc. Mental excitation, where it is continued for a long time, as in some forms of hysteria, or the mental strain that keeps the patient keyed up to the highest tension, as in some forms of business, calls for over-activity of the heart and favors hypertrophy.

The excitation of the heart induced by drinking tea, coffee, and alcohol, also favors this condition. The increased expenditure of force from an overdilatation of the blood-vessels by drinking large quantities of fluids, notably beer, is not to be overlooked as an exciting cause.

Lesions of the Heart.—By far the greater number of cases of cardiac hypertrophies, however, are due to endocardial changes affecting the valves or orifices of the heart. Just in proportion to the obstruction, is the heart called upon to do increased work, and the increased development is nature's method of prolonging the life of the individual.

Hypertrophy of the left ventricle is due to aortic insufficiency or aortic stenosis, also mitral insufficiency; while hypertrophy of the right ventricle is due to mitral stenosis and pulmonary obstruction. Hypertrophy of the left auricle follows mitral stenosis, and the right auricle will hypertrophy when there is tricuspid insufficiency.

Pericardial adhesions may give rise to hypertrophy as well as myocarditis. Bronchitis, empyemia, pleural adhesions, and, in fact, any respiratory disease that gives to obstructed pulmonary circulation, will cause hypertrophy of the right heart.

Disease of the Blood-Vessels.—General arterio-sclerosis, or sclerosis of the aorta, would give rise to hypertrophy, likewise all conditions of increased arterial tension, induced by contraction of the smaller arteries caused by irritating substances, chemical or infectious, such as syphilis, Bright's disease, etc. In fact, anything that increases the blood pressure in the larger or smaller vessels necessitates increased heart-action, and therefore acts as a causal factor in hypertrophy.

Pathology.—Hypertrophy of the heart exists in two forms, with and without dilatation of its cavities, the first being far more frequent. The morbid anatomy of the heart will therefore depend upon the form. The normal heart in the male weighs from nine to twelve ounces; in the female, from eight to ten ounces. In moderate hypertrophy it will vary from fifteen to thirty, and in exaggerated cases has been known to reach the enormous weight of sixty ounces, and is then known as the "cor bovinum"—ox-heart.

Simple hypertrophy exists where the cavities remain normal, and is usually confined to the left heart, though occasionally seen in the right ventricle where there is pulmonary obstruction. The ventricle walls may measure from one to two inches in thickness. It is doubtful if there is ever simple hypertrophy of the auricles, dilatation always accompanying the enlargement. The auricles

never reach the thickness of the ventricles, there being less muscular structure to undergo change.

The altered shape of the heart depends upon the part or parts involved, and also the degree of enlargement. Thus, where the left ventricle alone is involved, the pear-shaped form is maintained, the heart being elongated. Where the right ventricle is hypertrophied, as in mitral stenosis, the apex will be more blunt and composed largely of the right heart. Where both ventricles are involved, there is a marked broadening of the apex. Where greatly enlarged, the heart takes a lower position in the chest owing to increased weight.

When dilatation occurs, there may be a thinning of the hypertrophied walls. The papillary muscles and columnæ carnæ are often very much thickened. The color is dark red.

Symptoms.—It is quite difficult to separate the symptoms of hypertrophy from other lesions with which it is associated. In fact, during the period of compensation there may be an entire absence of subjective symptoms, especially when the hypertrophy is due to valvular lesions.

The compensatory changes take place so gradually that the stenosis or insufficiency is overcome by so delicate an adjustment of power that, unless some unusual strain is brought to bear upon the heart, the patient may be unconscious for months or years of any heart trouble.

As progressive changes occur, however, unpleasant sensations are experienced in the precordial region. Not a pain, but a sense of weight and oppression, especially when lying on the left side.

Overloading the stomach, active exercise, sexual excesses, or severe mental exertion bring on these symptoms in an exaggerated form, and the patient's attention is directed to the heart. Palpitation is not often present, though, if the patient be of a nervous temperament, he may complain of the "pounding of the heart against the chest wall." This may be quite noticeable if he has an irritable tobacco heart. Pain may be experienced following the excessive use of tobacco, alcohol, or coffee.

When the hypertrophy is excessive and the cerebral circulation is disturbed, the patient complains of dizziness, ringing in the ears, headache, flashing of lights before the eyes, uncomfortable flushing of the face, and a sensation as though the eyeballs were too prominent. This excessive hypertrophy may cause

arterio-sclerosis, and the heightened blood-pressure may result in rupture of the vessels, giving rise to apoplexy if in the brain, or to cough and hemorrhage if in the lungs (pulmonary apoplexy).

When dilatation takes place, the period of compensation gives way, and the symptoms are the same as in the last stage of valvular disease; namely, venous congestion; dyspnea now becomes a marked feature, the skin becomes cyanotic, and undulation of the cervicle veins is noticeable. Engorgement of the liver, with gastric disturbance, follows, and the secretion of urine becomes scanty, albuminous, and high-colored, owing to congestion of the kidneys. Finally, dropsy makes its appearance, first in the extremities, but gradually extending to the body, till general anasarca is established.

Physical Signs.—*Inspection.*—In children there is a widening of the intercostal spaces, and quite a perceptible bulging of the precordia. The apex-beat is often visible, and extends as low as the seventh or eighth interspace and to the axillary line. If the right heart be enlarged, there will be bulging of the lower part of the sternum. An impulse may be seen to the left of the ensiform cartilage, and especially in the sixth interspace. It may also be seen to the right of the sternum in the third and fourth interspace.

Palpation.—In simple hypertrophy, the impulse of the apex-beat may be felt at the sixth intercostal space and to the left axillary line. When the enlargement is excessive, it may be felt as low as the seventh or eighth interspace and to the left axillary line. The impulse is slow and heaving, and lifts the fingers when lightly placed. If dilatation be present, the impulse is more sudden or abrupt.

Percussion.—Increased dullness is observed in every direction, as high as the second interspace and as low as the eighth; to the left, to the axillary line; and if the right heart is involved, to an inch or more to the right of the sternum, giving a transverse area of dullness seven or eight inches in extent.

Auscultation.—In hypertrophy without dilatation, the first sound is often prolonged and dull, becoming clear, sharp, and more sudden as dilatation takes place. In young persons this first sound is accompanied by a peculiar clinking sound, which Laennec designates as the “*cliquetis metalique*.” There is ac-

centuation of the second sound, and in the aortic region is often reduplicated.

When the right is enlarged with dilatation, the first sound is loud, clear, sharp, and well defined. The second sound is sharply accentuated, and may be reduplicated in the second left intercostal space. A systolic murmur of tricuspid insufficiency may be heard over the lower part of the sternum.

Diagnosis.—The increased area of cardiac dullness, the heaving impulse, and the character of the cardiac sounds, would suggest hypertrophy of the heart. We are to remember, however, that there are a variety of causes that give rise to increased dullness, notably pericardial effusion, retraction of the lungs, with consequent exposure of the heart, mediastinal tumors, and aneurisms, and a careful examination should be made that we may eliminate the aforesaid conditions.

If we remember that in pericardial effusion, palpation reveals a diminution and finally obliteration of the cardiac shock, while in hypertrophy the heaving impulse is characteristic, we will avoid confusion. The dullness due to an aneurism is upward and to the right or left.

Pleural effusions will be recognized by previous history and by the absence of the heaving impulse. The same may be said of mediastinal tumors. Retraction of the lungs, exposing the heart to the chest-walls, may be due to tuberculosis or cirrhosis of the lungs. The history, a careful study of the symptoms, and auscultation would reveal the diagnostic difference.

Not infrequently we meet hysterical patients and neurasthenics who suffer from exaggerated palpitation, but if we note the character of the beat, we note the absence of the *heaving* impulse, and repeated examinations will soon remove any doubt as to its true nature.

Prognosis.—The prognosis depends largely upon the conditions present and the stage of development. It is generally unfavorable as to a permanent cure, but where the exciting cause can be overcome or controlled, the patient may enjoy a good degree of health and live his or her allotted time of life. The prognosis is more favorable when it occurs in early life than when it comes on in later years. If the general health is good and the patient refrains from severe physical exertion, it may never be detected during the lifetime of the patient.

Where the patient is delicate and anemic, degeneration sooner or later takes place owing to deficient nutrition, and the patient dies early. When due to valvular troubles, and the excitation continues calling for increased work of the valves, compensation finally gives way, dilatation occurs, and death terminates the disease.

Should the patient contract any of the infectious diseases, the heart would feel the force of the toxins, and to that extent be weakened, dilatation naturally following, when there may be a sudden termination of life. When the disease is ideopathic in the young, as in athletes, proper care, good hygiene, moderate exercise, and proper medication may result in a permanent cure.

If the physician can, by advice as to right methods of living and proper medication, maintain the period of compensation, the prognosis is favorable; but when this fails, the outlook is unfavorable.

Treatment.—The treatment of cardiac hypertrophy needs a careful study of each case, and will depend altogether upon the conditions present. When compensation is properly maintained, the treatment will be largely dietetic and hygienic. The diet should be plain, wholesome, and easily digested, and only as much as is consistent with health.

Coffee and tea should be used very sparingly, while alcohol and tobacco are to be absolutely prohibited. A quiet life should be enjoined, though moderate exercise in the open air is beneficial. All heavy work must be abandoned, and severe mental labor prohibited.

Regular habits are very essential, and eight, ten, or twelve hours' sleep encouraged. Sexual excesses must be prohibited.

The indication for remedies will depend upon several factors: thus respiratory wrongs would need remedies to control this phase of the disease. It may be bryonia for pain, lobelia for dyspnea, etc. Should dropsy be present, apocynum, digitalis, and like remedies, will be needed. Rheumatism would suggest the proper anti-rheumatics.

Where the hypertrophy is excessive, or rather where there is excessive power or force, veratrum may be used successfully, the indication being the full, bounding pulse. Its effects, however, should be watched carefully, and its depressing effects avoided.

Aconite adds tone to the heart, and encourages normal muscular action by removing irritation, and the *small, frequent, hard* pulse will be the symptoms calling for it. As the pulse is diminished in frequency, it gains in power.

Cactus encourages nutrition, adds tone to the organ, and is one of the best remedies in maintaining a stage of compensation. If it does not restore—and I am not sure but that it does to a certain extent—it at least retards for a long time further change, not only in the heart but in the blood-vessels as well. Of the specific tincture add ten to twenty drops to a half a glass of water, and give a teaspoonful every three hours. This should be taken for months.

One mistake in the treatment of these cases is in not continuing our remedies a sufficient length of time. Having selected the *right* remedy, patiently hold on to it till you get results; for in chronic heart troubles, beneficial effects are not seen in a few days.

Macrotys is an old and well-tried remedy where there is soreness and pain in the precordial region. The patient often complains of a bruised feeling; here macrotys will be found useful. If rheumatism be present, there will be additional reasons for its use. Cratægus has a similar action, and will often prove of great value.

Where dilatation occurs and compensation fails, quiet in bed must be strictly enjoined and nux vomica or strychnia given. Where the heart is feeble and dropsy appears, digitalis must not be overlooked. Apocynum will be indicated where there is general anasarca with feebleness; a decoction of the fresh root will increase the secretions from the kidneys and bowels, and at the same time add tone to the heart.

Lobelia will be called for to relieve asthmatic conditions where there is a sense of oppression, weight, and fullness in the precordial region, and where the pulse is of the same character.

Rhus Tox.—Frequently an irritation of the cerebro-spinal centers gives rise to irritation of the heart, which will be shown in the *small, frequent* pulse, with a *sharp* stroke. The patient is restless and starts in his sleep; in these cases, ten drops of rhus tox. to a half glass of water, a teaspoonful every one, two, or three hours, gives good results.

Echinacea.—Where there is septic infection, echinacea must not be forgotten.

CARDIAC DILATATION.

Definition.—Cardiac dilatation is an increase in the size of the cavities of the heart, which may be primary, with attenuation or thinning of its walls; or secondary, with thickening of its walls, hypertrophy, and dilatation.

Etiology.—Acute primary dilatation may be the result of undue exertion, without proper training, as excessive bicycling, mountain climbing, overwork on the running track, horizontal bar, or rowing, as witnessed in the enthusiasm of new members of athletic associations.

Heavy lifting by workmen who overtax their strength; strong emotional excitement, as intense anger or extraordinary fright, may also give rise to this form; in fact, any condition that gives rise to increased intra-cardiac pressure may produce dilatation. The right ventricle, in these cases, suffers most.

Dilatation from chronic valvular lesions have already been considered, and are among the most frequent causes; here, however, there is always hypertrophy as well. Obstruction of the pulmonary vessels due to chronic bronchitis, emphysema, tuberculosis, and kindred diseases, will also give rise to dilatation of the right heart.

Any disease that weakens the heart is a possible cause; thus myocarditis, resulting from the infectious fevers, such as typhoid fever, scarlet fever, and diphtheria; also rheumatic endocarditis and pericarditis; in fact, any condition that impairs the nutrition of the heart is a possible factor in producing dilatation.

Pathology.—The left auricle and right ventricle are the cavities most frequently affected, though any one or all combined may be involved in the process. When dilatation and hypertrophy are combined, it is usually secondary and due to valve lesions. If there be aortic insufficiency or stenosis, the left ventricle is first involved, to be followed in turn by the left auricle, right ventricle, and right auricle. Mitral insufficiency or stenosis is followed by dilatation of the left auricle, to be followed in turn by dilatation of the right ventricle and right auricle. Where chronic pulmonary diseases exist, the right heart will be the part affected.

The degree of dilatation varies; in extreme cases the auricles have been known to contain twenty or more ounces. If the ventricles are the cavities involved, the heart is broadened; but if all

the cavities share in the dilatation, the organ assumes a globular form. Where there is extreme dilatation the venæ cavæ and pulmonary veins also share in the same progressive changes. Parenchymatous, fibroid, or fatty degenerations of the heart and endocardium take place with the progressive changes.

Other organs are impressed in the same manner. The liver becomes engorged, and then undergoes degeneration, jaundice being an accompanying factor. The mucous membrane of stomach and bowels becomes congested, giving rise to severe functional disturbance. The brain early feels the effect of the general venous congestion, as seen by engorgement of the pia mater and increase of fluid in the ventricles.

Symptoms.—Dilatation being associated with those of hypertrophy, valvular lesions, and other cardiac complications, naturally shares the symptoms of the various combinations, feebleness, and incompleteness being the most pronounced. In proportion to the amount of dilatation do we recognize the heart's waning power. The patient experiences an undefined, uneasy sensation in the cardiac region; not exactly a pain, yet oppression of a distressing character. Dyspnea is one of the prominent symptoms, increasing as the cavities enlarge.

Where the right heart is involved, pulmonary symptoms soon develop, a hacking cough, attended with a serous and sometimes sanguineous expectoration, follows. As the dyspnea increases, the patient is unable to lie down without bringing on a series of spasmodic coughs, commonly known as cardiac asthma.

The pulse, as well as the apex-beat, is feeble. The pulse is often irregular both as to power and rhythm. The extremities, and even the body, are apt to be cool. Any undue exertion, either mental or physical, aggravates all the symptoms, especially the dyspnea.

The veins, particularly those of the neck, are distended, and the patient is more or less livid or bluish in appearance. Owing to congestion of the liver, there is a sense of weight and oppression in the right hypochondrium, and the patient takes on an icteric hue.

There is more or less gastric disturbance, resulting from the general congestion, and attacks of vomiting are not infrequent, digestion is imperfect, and the evidence of impaired nutrition is

apparent. Diarrhea announces the congested condition of the intestinal tract, and adds to the debility.

The kidneys are also frequently involved, and nephritis is a common attendant, the urine being scanty, high-colored, albuminous, and contains casts.

Cerebral congestion is attended by headache, dizziness, and sometimes vertigo. Delirium rarely occurs. With general venous congestion, edema appears, first in the feet, gradually encroaching upon the body, till finally anasarca or general dropsy results.

Physical Signs.—*Inspection.*—If the patient be thin or emaciated, and the dilatation be of the left ventricle, the apex-beat will be seen to be displaced downward and to the left. If the dilatation be of the right ventricle, the pulsation will be seen in the epigastrium. If the patient be well nourished, the feeble apex-beat may not be seen, and other signs must be looked for to aid in the diagnosis. In advanced cases, visible pulsation of the jugulars is pronounced.

Palpation.—The feeble, undulating apex-beat may be felt, though not constantly. If the dilatation be of the right heart, a pulsation may be quite pronounced over the liver. The jugular pulse may be readily felt, even though not visible.

Percussion.—Dullness will be increased transversely to the left axillary line in dilatation of the left ventricle, and to the right nipple line when the right heart is dilated. If the auricles are involved, the area of dullness may extend to the first rib and transversely as far as when the ventricles are involved.

Auscultation.—Dilatation is always associated, more or less, with valvular insufficiency or stenosis, and, therefore, pre-existing murmurs will necessarily influence the sound made by dilatation. The first and second sounds are quite similar, and are short and sharp, resembling fetal heart-sounds, the long pause being shortened. Irregular pulsations, both as to time and force, have been noted, and the canter rhythm is not uncommon.

Diagnosis.—The diagnosis of dilatation of the heart is less difficult than many other organic lesions. The wavy or undulating apex-beat, the first and second sounds being sharp and of the same length; the canter rhythm, or embryo-cardia; the frequent irregular pulse; pulsation in the epigastric region; the wavy pulsation in the jugulars, and the general cyanotic appear-

ance, together with anasarca, make a group of diagnostic symptoms that can scarcely lead to a mistake.

Prognosis.—The prognosis of cardiac dilatation is always unfavorable, and though life may be prolonged by careful living, change of climate, and remedies that add tone to the organ, we are not to forget that the changes are progressive and the termination is death in most cases.

Treatment.—The patient must clearly understand that severe muscular or mental exertion, or *anything* that causes *unusual* excitement, *must* be positively forbidden. The patient should lead a quiet life, as much in the open air as possible, and have such diversion as will attract his attention away from himself.

The aim of all treatment in cardiac dilatation is to *increase the muscular power of the heart*. To make good muscle requires good blood, and this requires good digestion. Diet, then, will be an important factor in the treatment; this should consist of good, nutritious food, easily digested, and only enough fluids allowed as is compatible with health.

Any disturbance of the stomach should be corrected, constipation should be overcome, and hepatic derangements should be controlled. A few remedies will be indicated, and should be given to overcome special conditions. For the small, feeble, irregular pulse, aconite, in the small dose, will give good results. We give the remedy, not for its sedative effect, but to add *tone* to the heart. Five drops of the agent to four ounces of water, and a teaspoonful every three hours, will not disappoint you.

Cactus.—This remedy does not overstimulate and thus weaken the heart action, but its tendency is to increase the heart's nutrition and add power to the muscle. Of the specific tincture, use twenty drops, to water four ounces. Goss says of this remedy: "If the patient suffers from a cramping pain, like a band around the heart, I have *always* found this agent gives quick relief."

Cratagus.—This is a remedy that is receiving a great deal of attention in cardiac lesions, and as a tonic and restorative has given excellent results. The remedy should be given in from five to ten drop doses.

Lobelia.—This will afford some relief to the distressing dyspnea, though we are not to forget the mechanical obstruction causing the difficult breathing and expect too much of the remedy.

Apocynum is the remedy when dropsical effusion appears. It

not only stimulates the kidneys to carry off accumulations, but strengthens the heart at the same time.

Digitalis will be used for similar conditions.

Lycopus Virginicus will be a good remedy where pulmonary troubles arise, attended by cough and hemoptysis.

Spigelia, alternated with *bryonia*, will afford relief when there is pain, sharp and stabbing in character.

No matter what agents are employed, the patient should be kept as quiet as possible, saving the heart any unnecessary work. Smoking should be prohibited.

CARDIAC ATROPHY.

Definition.—Cardiac atrophy is a decrease in the size, strength, weight, and activity of the heart.

Etiology.—The causes depend somewhat upon the character of the atrophy, whether general or local. Thus mitral stenosis gives rise to a local atrophy, the left ventricle being the part affected. Other parts may atrophy when degenerative changes are confined to a portion of the heart, while general cardiac atrophy may arise from causes that impair or interfere with the nutrition of the body, the heart sharing in the general atrophy, cancer of the stomach, phthisis pulmonalis, suppurative processes where long continued, Bright's disease, etc., being examples. Partial obstruction of the coronary arteries may give rise to atrophy by impairing the heart's nutrition. Senile atrophy is usually the result of failing nutrition. General atrophy may also be congenital.

Pathology.—The degree of atrophy varies, Bramwell reporting a case in an adult where the heart weighed only two and three-fourths ounces. The surface of the heart loses its regular outline, becoming wrinkled or rough, while the coronary arteries are quite tortuous. As the waste exceeds the supply, the sub-peritoneal fat early disappears, and may be replaced by a granular or mucous tissue.

The color varies; it may be pale and firm, or it may be yellow and known as yellow atrophy; again it may be pigmented, soft, and granular, and known as brown atrophy. The muscular fibers may be replaced in part by granular or fatty material.

Symptoms.—The symptoms of cardiac atrophy are not very pronounced, feebleness of action being the most prominent; but as this is characteristic of all wasting diseases, we may not gain much information from this source. The apex-beat is quite weak and often invisible, and, though percussion shows the area of dullness diminished, it may be due to pulmonary emphysema.

Diagnosis.—While atrophy may be suspected, a positive diagnosis is only made post-mortem.

Prognosis.—The prognosis depends more upon the underlying disease than upon the extent of the atrophy of the heart; for, though diminished in size, there is diminished work required, and a proper balance is maintained.

Treatment.—The treatment will be tonic and restorative. Where the primary lesion can be overcome, our treatment will be directed to the accomplishment of that end. Gentle exercise in the open air, a good, nutritious, and easily digested food supplied, will be an important factor in the treatment. All measures that look to a better blood supply will aid in prolonging life. Incidentally cactus or cratægus may be given as heart tonics.

ACUTE MYOCARDITIS.

Synonym.—Carditis.

Definition.—Acute myocarditis is an acute inflammation, diffuse or circumscribed, of the interstitial or parenchymatous substance of the heart.

Etiology.—Two forms of myocarditis are recognized, the diffuse or parenchymatous and the circumscribed.

Diffuse or parenchymatous myocarditis is rarely ever idiopathic, but follows as a complication or result of some other disease. It occurs most frequently in the course of the infectious fevers, especially typhoid fever, diphtheria, and scarlet fever, and the sudden deaths in these cases from heart-failure can be traced in nearly every case to myocarditis.

Endocarditis and pericarditis, if of a severe type, nearly always extend to the myocardium. Rheumatism figures as a causal agent, as does gonorrhea. We may be safe in saying that the toxins in any infectious disease may so influence the heart as to give rise to myocarditis.

Circumscribed myocarditis may arise from the same sources that give rise to the diffuse form; viz., the infectious fevers; or it may be due to emboli in the coronary arteries.

Pathology.—The heart, in the early stage, is of a dark-red color, swollen, softened, and injected; later it changes to a yellowish gray or mottled appearance, and is readily broken down. There may be dilatation of the cavities, and if there has been localized myocarditis, weakening the tissues, partial aneurism may result.

The more minute changes consist in an infiltration of the interstitial substance of round cells, and later fibroid degeneration. The muscular fibers undergo fatty or granular degeneration.

In the diffuse form the chief pathological changes take place in the connective tissue, and the left ventricle suffers more than the right.

In the localized or circumscribed form there are areas of necrosis, which are followed by abscess formation. These abscesses may open into the cavities of the heart, and thus enter the blood-stream, giving rise to abscess formation in other portions of the body. A favorite location for an abscess is in the interior wall of the ventricle near the apex and septum. They may empty into the pericardium, resulting in suppurative pericarditis. When they perforate the heart cavities, in addition to poisoning the general blood with an accompanying septicemia, they often give rise to malignant endocarditis. This form usually terminates fatally, though, in rare cases, nature throws a covering around the abscess, the pus is incapsuled, and undergoes caseation or calcification.

Symptoms.—The symptoms of the primary lesion usually so obscure the true nature of the disease that subjective symptoms may be entirely absent. If, however, there is a sense of constriction of the chest, some palpitation, more or less dyspnea attended by slight pain, and the pulse is rapid, small, and easily compressed, evidences of cardiac enfeeblement, myocarditis would be suggested.

Should suppurative myocarditis exist, and the abscess perforate the cavities, embolic manifestations would appear in brain, lungs, or spleen. An increase of temperature, with the above symptoms, would naturally follow, and, if suppurative in character, the fever would be of a septic type.

Physical Signs.—The physical signs are similar to those of dilatation. The action of the heart, in the early stage, is tumultuous, but as changes take place it becomes small and irregular.

Auscultation reveals the first and second sound of nearly equal length, short and sharp, which soon becomes feeble. If dilatation has taken place, murmurs frequently develop. The most frequent is a systolic murmur suggesting mitral insufficiency.

Diagnosis.—The diagnosis may not positively be made during life; however, great heart enfeeblement as shown by the weak first sound or systolic murmur and the small irregular pulse would suggest myocarditis.

Prognosis.—The prognosis is favorable where it appears in a mild form, though the severer forms usually terminate fatally and the sudden termination of life during the infectious diseases, notably diphtheria and typhoid, may not infrequently be due to myocarditis.

Treatment.—Absolute rest must be enforced in every case; the reclining position should be observed, and nutrition maintained.

The agents recommended for endocarditis and pericarditis will be found useful. In fact, the above mentioned diseases are nearly always attended by more or less myocarditis. Heart tonics should be used with great care. Cactus, in small doses, will be a good agent. When the heart flags, carbonate of ammonia as a diffusible stimulant will be found beneficial, as will also strychnia.

Septic conditions will require antiseptics, and when there is rheumatism with an acid condition of the blood, the acetate, citrate, nitrate, or lithiate of potassium will be found beneficial.

CHRONIC MYOCARDITIS.

Synonyms.—Fibroid Heart; Cardio-Sclerosis; Chronic Interstitial Myocarditis.

Definition.—A chronic inflammation of the heart muscle, resulting in induration, due to fibroid degeneration.

Etiology.—Sclerosis of the coronary arteries, Bright's disease, diabetes, rheumatism, gout, and the excessive use of tobacco and alcohol, are the most frequent causes of fibroid degeneration.

Sclerosis of the coronary arteries may be due to chemical irritants or syphilis, or may follow as a result of the infectious diseases. Each of these may be said to act as a causal agent. It may be an extension of chronic endocarditis and pericarditis; it may also follow acute diffused myocarditis. Chronic valvular lesions may so impair the nutrition of the heart as to give rise to myocarditis, or it may be due to a direct extension of the inflammation along the cordæ tendineæ, or valves, to their muscular attachments.

Age and sex predispose somewhat, as sclerotic changes occur more frequently in elderly people, and more males than females suffer from this lesion. When the disease occurs during fetal life, the right heart is the seat of the disease.

Pathology.—While the anatomical changes may be diffuse, they are usually circumscribed, the wall of the left ventricle, the septum, and the papillary muscles being, even in the diffuse form, more extensively involved. In fetal myocarditis the apex of the right ventricle is the favorite site.

The muscular fibril is replaced by fibrous tissue, which is dense, hard, and of a grayish-white appearance. The weight of the heart is increased, both by the degenerative changes and the hypertrophy and dilatation that so frequently accompanies it. There may be a narrowing of the pulmonary and the aortic orifices due to contraction of the changed tissue.

The branches of the coronary arteries may be occluded, either by circumscribed areas or by emboli. These sclerotic changes in the coronary arteries are frequently due to syphilis, resulting in obliterating endocarditis. When aneurism of the heart occurs, it is usually due to arterio-sclerosis. In advanced stages, fatty degeneration may replace the fibroid or be associated with it.

Symptoms.—The symptoms are not at all characteristic; in fact, they are so indefinite in many cases as not to cause a suspicion of the true difficulty, and the true nature is only revealed during an autopsy. The hypertrophy, that usually attends, so compensates that the patient is unaware of his condition.

Generally, however, there is evidence of enfeeblement, and this is accompanied by dyspnea and more or less palpitation. A sense of constriction is often present, and attacks of angina become quite frequent and distressing. The pulse is slow and often

irregular, the pulse-rate being reduced to fifty, forty, or even less, per minute.

When there is a sudden failure of the cerebral circulation, or after unusual exertion, the patient may be attacked with syncope. Pseudo-apopleptic attacks may terminate in sudden death.

Physical Signs.—Where hypertrophy exists, the apex-beat is displaced downward and to the left, the dullness being in the same direction. Although the heart-sounds may be clear and strong early in the disease, they soon become feeble and indistinct.

Diagnosis.—The recognition of this disease before death is extremely difficult, and though cardiac weakness may be easily determined, it is often indistinguishable from hypertrophy with dilatation or the many valvular lesions. Generally the absence of murmurs enables us to differentiate it from valvular lesions. To distinguish it from fatty degeneration is quite impossible. Frequent attacks of angina would excite suspicion more than any other symptom, and if the pulse were reduced to fifty or forty per minute, additional reason would exist for believing in chronic myocarditis.

Prognosis.—The prognosis is usually unfavorable as to a cure, though favorable as to life. The disease comes so insidiously in the majority of cases, and degenerative changes have so far advanced, that a complete cure is out of the question. If, however, the patient can refrain from severe mental or physical exertion, can live in an equable climate, and be much in the open air, the life may be prolonged to its allotted period. Where frequent attacks of angina occur and the cerebral circulation suddenly fails, death may occur quite suddenly.

Treatment.—The habits and methods of living should be thoroughly impressed upon the patient. No severe mental or physical exertion should be allowed, no tobacco permitted, while coffee and tea should be taken sparingly or not at all. Gentle exercise in the open air is advisable. The diet should be nutritious, and, as a rule, fluids should be restricted.

In the way of medication, strychnia as a stimulant, when there is great debility, will be found useful. In case of syncope, a hypodermic injection of camphor and ether will give good results.

Cactus and cratægus are agents that will improve the innervation and nutrition of the heart, and should be administered for a long time.

If syphilis exists, the anti-syphilitics will be used.

DEGENERATIONS OF THE MYOCARDIUM.

Anemic necrosis, anemic infarct, or white infarct, is the term given to that form of myocardiac degeneration due to occlusion of the branches of the coronary artery. As the anterior coronary artery is most frequently the seat of the obstruction, the infarcts are most frequently found in the left ventricle and septum, parts supplied by this branch of the artery, and consist of patches of grayish white or grayish red, wedge-shaped masses. These may become softened and break down, forming what is known as myomalacia cordis. This softened, and therefore weakened area, may cause a rupture of the heart.

At other times these spots, in place of softening, change to a hyalin appearance, which in turn become sclerotic. The minute changes in the muscular tissue are the replacement of the muscle fibers with granular material. At other times they assume a hyalin form, and finally become sclerotic.

The symptoms are obscure, unreliable, and of no diagnostic value. Death may occur suddenly, and an autopsy alone reveal the lesion.

Calcarius degeneration, or calcification of the myocardium, is of very rare occurrence, and consists of the displacement of the muscular fiber by limy deposits.

Calcification of the valves occurs more frequently. Following myocardial abscesses, chalky nodules may sometimes be found.

Amyloid Degeneration.—This, like calcification, is a rare disease, and results from the same causes that give rise to amyloid disease of any other part. It is more apt to be confined to the blood-vessels and interstitial tissues, and is frequently preceded by suppurative processes, tuberculosis, syphilis, etc.

Hyalin Degeneration.—This has already been noticed in connection with anemic necrosis, and may also be found in connection with amyloid degeneration. The connective tissue is replaced in limited areas by a glossy, transparent material.

It may occur independently of other degenerations and follows prolonged suppurative fevers. The fibers become swollen, and are changed into a homogeneous translucent material.

Brown Atrophy.—This is a form of degeneration that is frequently found in connection with other degenerations, especially fatty, and consists of a deposit in the muscular tissue of a yellowish-brown, granular material. It is found in advanced valvular troubles sometimes, and in old people.

The diagnosis is made post-mortem.

Parenchymatous Degeneration has been considered in chronic myocarditis.

Fatty Degeneration.—This is not to be confused with fatty infiltration or fatty overgrowth. Fatty degeneration is the replacement of the muscle fiber by oil globules or fat. This is perhaps the most common of all degenerations and is due to faulty nutrition. This may arise from many conditions. We may say that all wasting diseases, such as tuberculosis, carcinoma, acute and chronic anemia, and the various infectious diseases, are causal conditions.

Syphilis, by its poisoning effect, may change the nutritive properties of the blood to such an extent as to render the fiber unable to reproduce itself. Pericarditis and the valvular lesions, which have already been considered, also favor this condition. Disease of the coronary arteries, by impairing nutrition, is a frequent cause. It is also associated with other degenerations, parenchymatous, white, infarct, etc. The disease is more frequently met with after middle life, and is more common in men than in women.

Certain poisons, such as phosphorus, arsenic, and alcohol, are followed by fatty degeneration. When due to phosphorus or arsenic, the degeneration is sometimes quite rapid, while if from alcohol it involves a much longer time.

Pathology.—The degeneration may be confined to local areas or the entire organ may be involved. Usually the left ventricle and papillary muscles are the seat of the tissue change. Yellowish patches are seen, which are friable and easily torn. Sometimes it is of a reddish-brown color, and frequently occurs with brown atrophy. Its friability favors rupture of the organ, which

sometimes occurs. If the entire organ be involved, there is enlargement, its walls being flabby.

Fatty degeneration of the heart is not infrequently associated with fatty degeneration of other parts of the body. As a result of its friability, dilatation of its cavities is not uncommon. Sclerosis of the coronary arteries is often found.

Symptoms.—The symptoms of this form of degeneration are not characteristic and may not be separated from myocarditis. Enfeeblement is always a prominent condition, and palpitation, dyspnea, and a quick, feeble, and irregular pulse, with cool, clammy extremities, are symptoms that would arouse suspicion of the true condition.

Cardiac asthma, with occasional attacks of angina pectoris, may also be present.

Physical signs are similar to those of cardiac dilatation.

Diagnosis.—The diagnosis is extremely difficult. The age of the patient, the enfeebled action, the small, irregular pulse, the evidence of dilatation, the dyspnea and palpitation, cardiac asthma and angina pectoris, and, in advanced stages, the Chyne-Stokes respiration, would all suggest fatty degeneration, though a positive diagnosis should not be made.

Prognosis.—The prognosis is unfavorable as to a cure, though the patient may live for years after tissue changes have taken place. Undue exertion, or great mental excitement may result in rupture of the heart, and sudden death.

Treatment.—If one keeps in mind the conditions that give rise to degenerations, the line of treatment will suggest itself. Impaired nutrition, enfeebled vitality, and cell formation prevent normal tissue formation. To make a good blood, to renew the tissue, and to break down the old and imperfect tissue, is a difficult task, and one that many times is impossible to accomplish.

Hygienic measures are important. An equable climate, an out-of-door life, gentle exercise, regular habits, and the avoidance of severe exertion or mental excitement, will do much for the patient. A nutritious but easily digested diet, with a restriction of fluids, especially at meal-times, will assist largely in maintaining the health, and further stay tissue change.

Cactus, pulsatilla, cratægus, lobelia, etc., will be used as occasion demands.

FATTY OVERGROWTHS.

This is frequently the result of general obesity and may completely envelop the heart, sometimes the layers of adipose tissue being an inch or more in thickness. When excessive, the pressure may give rise to atrophy and enfeeblement.

The fat in the auriculo-ventricular furrows may also be greatly increased, while infiltration between the muscular fibers is not uncommon, and may extend to the endocardium.

This condition is generally seen after middle life, and among high livers who lead a sedentary life.

Treatment.—The treatment is principally hygienic and dietetic. A rigid diet, with a sparing use of fluids, will generally accomplish wonders. No fluids at meal-times, nor for two hours after, should be made an absolute law. Exercise in the open air, as much as can be taken without unduly wearying the patient, should be rigidly enforced. Small doses of the juice of *phytolacca* berries may be given, but the effect should be carefully watched.

DISEASE OF THE CORONARY ARTERY.

Disease of the coronary arteries has been considered in anemic necrosis, and needs no further mention.

CARDIAC ANEURISM.

Aneurism may be confined to the valves—valvular aneurism; or may involve the walls of the myocardium—aneurism of the heart-wall.

Etiology.—Aneurism of the valve results from endocarditis, either acute or chronic, whereby the reflection of the endocardium upon the valve becomes softened or destroyed, and the introcardial blood-pressure produces dilatations, spherical in form, the convex side facing the least resistance. Thus, when of the aortic valve, the most frequently involved, the aneurism bulges into the left ventricle; while if the mitral valve be the one involved, the aneurism projects into the left auricle. When rupture occurs, valvular incompetency is pronounced.

Aneurism of the wall is usually due to weakening of the tissue

by myocarditis, though the various degenerations, which occur in the heart, as well as mural endocarditis, may be responsible for it. Knife-wounds have also been followed by aneurism. Pericardial adhesions may so weaken the wall as to favor dilatation.

Pathology.—The dilatation, followed by saculation, is usually found near the apex in the left ventricle. In size, they vary from that of a marble to that of a croquet-ball. There is usually only one, though this may be saculated, forming two patches in one cavity, and Peacock reports a case where there were three pouches. The endocardium is found to be opaque, while the myocardium may undergo degeneration or sclerosis.

Symptoms.—The symptoms are not sufficiently definite to excite suspicion of the true character of the disease. There is general enfeeblement, due to the lesions that give rise to it, and sometimes a bulging, pulsating tumor may be seen in the apex region.

Diagnosis.—A positive diagnosis is only made post-mortem.

Prognosis.—The prognosis is unfavorable, and, though death may occur suddenly from syncope and rupture, it is usually due to exhaustion depending upon the myocarditis or the degenerations which give rise to it.

Treatment.—The same line of treatment as was suggested in cardiac degenerations will be followed in aneurism. Hygienic, dietetic, and such cardiac remedies as may be required to meet special conditions, will compose the treatment.

RUPTURE OF THE HEART.

This very rare accident occurs after the heart has been weakened by degenerations, especially fatty degeneration. Quain has found this to be the cause in seventy-seven out of a hundred cases examined.

Suppurative myocarditis and obstruction of the coronary artery resulting in anemic necrosis, are also responsible. It occurs most frequently after the age of sixty, the time of life when the degenerative changes culminate so disastrously. It occurs more frequently among males than among females, owing to the more strenuous life of males. The culmination may be the result of

severe exertion, though it has occurred when the patient was at perfect rest.

The point of rupture is usually in the anterior wall of the left ventricle, more rarely in the right ventricle. The pericardium is generally filled with dark, coagulated blood.

Symptoms.—This accident usually results in sudden death. The patient is seized with a sharp, stablike pain, may cry out in his anguish, and fall unconscious, or, grasping the region of his heart with his hand, remain stationary, fearing to move. A deathlike pallor spreads over the face, the surface is covered with a cold sweat, the pulse is tumultuous, and the patient falls unconscious. If he survives a few hours, the dyspnea is marked and the pain agonizing in character. Mays reports a case that lived for seventeen days after the rupture.

Diagnosis.—Excruciating pain in the cardiac region, pallor of face, cold sweat, and a sense of suffocation, would suggest a rupture of the heart.

Prognosis.—The prognosis is always hopeless, for if death is not sudden, the patient's life is prolonged but for a few hours or a few days at most.

Treatment.—The only treatment that will be of great benefit will be prophylactic, for after the accident, opiates, to relieve the intense pain, is all that can be used.

In every case where there is reason to believe that myocarditis, obstruction of the coronary arteries, or degenerations exist, the physician should explain the danger and the result which is liable to follow, unless the patient leads a very temperate life.

All excesses should be avoided. The diet should be nutritious, but easily digested, and as little fluid as is consistent with health should be allowed. Gentle exercise in the open air, and a residence in an equable climate is desirable; unfortunately but few can profit by such advice, though very much depends upon one's environment.

When rupture has occurred, complete rest in bed, hypodermic injections of morphine, with local applications to relieve pain, will constitute the treatment. Stimulants should be avoided, as they increase the hemorrhage.

MINOR CARDIAC AFFECTIONS.

New Growths.—While new growths may originate in the myocardium or endocardium, they are more apt to be an extension from the parts. Cancer, as a primary disease of the heart, is of very rare occurrence, though as an extension from the mediastinum, the lungs, or pleura, it is occasionally seen.

Syphilitic deposits are found on the valves, and in the ventricles, more frequently the left. Cysts are very rarely found. Myxomatous, fibroid, lipomatous, sarcomatous, lymphoid, and sometimes chondromatous growths occur, though they are not common. They are more apt to develop in the pericardium than in the heart substance.

The symptoms are negative, and the growths are only discovered post-mortem; hence the prognosis and treatment need no consideration.

Parasites.—The heart may be the habitat of four forms of parasites; the *tænia echinococcus*, *cysticercus*, *cellulosæ*, *actinomyces*, and *pentastomum denticulatum*. The first two, by developing cysts, may produce serious results. They are more frequently found in the right ventricle. When they rupture, if it be in the right ventricle, secondary cysts of lung sometimes develop. As a result of rupture of the cysts, portions may float off in the general circulation, and give rise to embolic abscesses in various organs of the body. These cysts are generally found in the liver and other organs at the same time.

Misplacement.—Malpositions of the heart may be congenital or acquired as the result of excessive tympany, ascites, tumors, or disease of neighboring parts. The most important and remarkable congenital malposition is where the heart is located to the right, in place of the left median line. The apex-beat is found in the fifth interspace of the right side, and the general boundaries are the same, otherwise, as if located on the corresponding side. The arch of the aorta curves over the right bronchus instead of the left, and the descending aorta is to the right of the spinal column instead of to the left. Usually there is an interchange of the other organs, though not always. Thus the liver takes the left side, and the spleen occupies the right.

In the fetus the heart occupies the median line, and occasionally this persists after birth. Another malposition is where the

heart is found immediately beneath the skin, the sternum being missing. The heart has also been found misplaced in the abdominal cavity.

A rare and a serious displacement is where the heart occupies the cervical region. Floating heart is that condition where its attachments become weakened and relaxed and the heart becomes more or less motile.

Wounds and Foreign Bodies.—Although wounds of the heart are generally fatal, occasionally an injury of the heart occurs that startles the medical world. Bullets have been found encysted in the ventricles, and only recently a man was stabbed in the heart, severe hemorrhages followed, but the surgeon hurriedly opened the pericardium, stitched up the gaping wound, and, to the surprise of every one, the patient recovered. Pins have been found imbedded in the heart.

IV. NEUROSES OF THE HEART.

PALPITATION.

Definition.—Palpitation is the consciousness of the heart's action, which may be normal in power and in time of beat, though there is increased power and frequency, attended by more or less anxiety and distress.

Etiology.—The fact that "delirium cordis," a condition of extreme disturbance, frequently exists in heart-troubles, and yet the patient is entirely unconscious of the existence of any disturbance, while at other times the patient complains of great distress from the severe palpitation when an examination reveals the heart's action to be normal in power and frequency, shows conclusively that it may be nervous in character.

Among the causes that may be mentioned as giving rise to palpitation, are:

Dyspepsia.—Indigestion, I believe, is responsible for more cases of functional heart-disease than all other causes combined. The distension of the stomach by gas, presses against the sensitive nerves of the heart, which gives rise, not only to palpitation, but irregular heart action as well.

Nervous Lesions.—Emotional excitement, especially the distressing emotions, such as fear, grief, and despondency, are causes. It also occurs in neurasthenia. Hysteria is not infrequently accompanied by palpitation. Sexual excess, especially masturbation, is another common cause of cardiac palpitation.

Stimulants.—The use or abuse of tea and coffee, as well as alcohol, will cause an irritable and excessive action. Tobacco may be included in the same list. The irritant action from a poorly elaborated blood, as found in anemia, will also give rise to this condition; prolonged fever gives rise to palpitation in the same way.

Reflexes.—A common, though often overlooked, source of irritation is rectal troubles. Hemorrhoids, fissures, fistules, and papillæ may give rise to such nerve-waste as to produce their reflex influence on the heart. Disease of the uterus, ovaries, and urethra may act as indirect factors in the same way. Chronic valvular lesions, as well as some other organic lesions, may give rise to palpitation, though not frequently.

Symptoms.—If the attack be mild in character, there may be but little change in the character of the pulse, the force and frequency being found, upon examination, to be normal. The *consciousness* of the patient, of his heart's action, however, renders him nervous, and a worried or anxious look tells of his mental discomfort.

Where the attack is severe, the heart beats tumultuously, and the patient feels the impulse against the chest-walls, and often hears the sound of his own heart-beat, while the physician may see the pulsation if the chest-walls be thin, and, by placing the hand over the heart, detect its throbbing character. There may be a choking or smothering sensation, especially if the subject be hysterical, and the patient, alarmed and anxious, fears impending dissolution.

Sometimes a cold sweat occurs; there is pain in the precordial region, rapid breathing, the extremities become cold, the eye-balls protude, there is a ringing in the ears, vertigo, and an attack may terminate in unconsciousness. If the patient be neurasthenic, an attack may be followed by the passing of a copious quantity of clear urine.

The attacks are usually intermittent and paroxysmal in character, though they may be more or less constant.

Physical Signs.—Inspection will often reveal a visible and forceful impulse, and also throbbing of the superficial vessels.

By placing the fingers or the hand over the region of the heart, a heaving and throbbing impulse is felt, while the pulse at the wrist is full and bounding or sharp and frequent, sometimes quite irregular.

Auscultation shows the first sound magnified; it is loud, abrupt, short, and may be heard without applying the ear to the chest.

Percussion may reveal an increased dullness, though usually the dullness is natural.

Diagnosis.—The condition, *palpitation*, is readily recognized by the complaint of the patient, and the symptoms already named, and a careful physical examination will reveal whether it be a neurosis or due to organic disease.

Prognosis.—The prognosis is favorable as to life, and also as to permanent results, where the causes can be removed. When due, however, to epilepsy, prolonged masturbation, spinal irritation, and such causes as frequently do not yield to treatment, the outlook is not encouraging.

Treatment.—The patient's mental disturbance must be quieted by positive assurances that an unfavorable termination will not occur. It is well to put the patient to bed, enjoin quiet, and have anything that would tend to excite him removed from his presence.

After a hopeful and reassuring talk, place the patient on *pulsatilla*, if the sensation of impending death predominates, or if there be a constant dread of an indefinable character present; in these cases *pulsatilla* will give good results. Ten to twenty drops of the specific tincture in a half glass of water, a teaspoonful every one, two, or three hours, as the case may demand. If there be precordial oppression, with a sense of suffocation, add ten drops of specific *lobelia* to the above remedy, and give every twenty, thirty, or sixty minutes. If there be pain present, alternate the above with *bryonia* or *macrotys*, ten drops of each to water four ounces, and give teaspoonful every hour.

Where there is great excitement, the patient is flushed, nervous, and restless, *gelsemium*, ten to thirty drops to half a glass of water, will be of good service. Cactus is a good remedy when

the heart's action is weak. When the force is violent, *veratrum*, thirty to sixty drops to half a glass of water, will be the better remedy.

After an attack is over, the treatment will be directed to overcoming the exciting cause.

When due to indigestion, the diet should be regulated, fluids at meal-times forbidden, and the various dyspeptic conditions corrected.

If anemia is the exciting cause, our attention is directed to furnishing a better quality and quantity of blood.

If alcohol, tea, coffee, or tobacco are responsible, they are to be *absolutely* prohibited. Where due to rectal irritation, or ovarian or uterine trouble, these wrongs must be corrected before a cure can be effected.

Regular habits should be enjoined, all forms of dissipation corrected, and for persons of sedentary habits an out-of-door life advised. A trip, lasting several weeks or months, where the attention of the patient is turned from self to new objects, new faces, new scenes, will often accomplish far more than will the administration of drugs.

TACHYCARDIA.

Synonyms.—Rapid Heart; Synchosphyxia; Paroxysmal Hurry of the Heart.

Definition.—Tachycardia is a rapid action of the heart, either constant or paroxysmal. It is usually associated with palpitation, though it may be entirely independent. There are generally no subjective symptoms of forcible action in tachycardia.

Etiology.—Occasionally we meet with a physiological tachycardia, the normal pulse running a hundred or more per minute, and still more rarely is found a patient who can increase the pulse-rate at will.

The rapid heart seen in all fevers is not usually considered under the head of tachycardia, but is limited to that form which is paroxysmal in character. It is generally due to a neurosis, though it sometimes occurs as the result of a growth or clot in or about the medulla. Also pressure of the pneumogastrics by growths or tumors may give rise to it. The peripheral neuritis of

the pneumogastrics produced by the toxins of the various infectious fevers may be attended by heart hurry.

The more frequent causes, however, are reflex, and may be due to wrongs of the rectum, the uterus, ovaries, bladder, or urethra. Fright, grief, and emotional excitement are frequently the exciting causes of a rapid heart. Severe physical or mental exertion may be followed by a rapid heart-beat, which may continue for days. Sexual excesses and masturbation will also give rise to this condition, some cases being especially stubborn in yielding. Often associated with palpitation, the same causes may give rise to it. Anemic and chlorotic females are subject to rapid heart, while the victim of hysteria or neurasthenia may suffer with paroxysms of tachycardia. It sometimes occurs in females during the menopause.

Pathology.—No characteristic lesions are found, though neuritis of the pneumogastric and myocardial degenerations have been discovered post-mortem.

Symptoms.—Where tachycardia is permanent, there are few pronounced symptoms aside from rapid pulse-beat; but in the paroxysmal form, true tachycardia, the symptoms are more varied and pronounced.

As a rule, the attacks come on suddenly and often without any premonitory symptoms. In other cases an attack is announced by vertigo, ringing in the ears, and a sense of danger impending.

The subjective symptoms also vary. Sometimes there is almost an entire absence of unpleasant sensations, the patient being unaware of the increased movement of the heart; in fact, he is inclined to believe that the heart-beat is not sufficiently rapid. At first the face is pale, but it soon becomes flushed and sometimes turgid.

The pulse is small, weak, easily compressed, and sometimes irregular. At the beginning of an attack the pulse rapidly increases to one hundred and fifty or two hundred beats per minute, and has been known to reach three hundred per minute.

The respiration may remain normal in frequency, though it is usually somewhat increased. There may be dyspnea and sometimes a feeling of uneasiness, or even pain, in the precordial region. It is not infrequently associated with palpitation, and the patient becomes extremely anxious as to his condition. Vertigo, headache, and ringing in the ears may continue through an at-

tack. An attack may last for but a few minutes, or it may last for hours or sometimes days.

Physical Signs.—If the chest-walls be thin, the rapid, diffuse, and irregular impulse may be perceptible on inspection. Palpation but confirms the visible signs. There may be no enlargement of the heart, and nothing is learned by percussion.

FIGURE 23. PULSE-TRACING IN A CASE OF TACHYCARDIA.—(*Goodno.*)

Auscultation may show the heart-beats somewhat modified. Since a less amount of blood is thrown into the aorta with each ventricular systole, the first sound will be slightly accentuated, while the second sound will be diminished. The second pulmonic sound may sometimes be increased, as may also the first systolic sound. Murmurs are seldom heard.

Diagnosis.—The diagnosis is readily made unless complications exist. The great rapidity of the heart's action, with an absence of subjective symptoms, is characteristic. Dyspnea, precordial oppression, pain, and a sense of impending danger are generally associated with palpitation, and where present in tachycardia, are much milder than in the former.

Prognosis.—The prognosis depends somewhat on the causes giving rise to it, though at best it yields but slowly. It seldom proves fatal, though in elderly patients there may be rupture of the cerebral vessels, or death may result from heart exhaustion.

Where the tachycardia is due to reflexes, a cure may result in a removal of the cause. The various orifices should be carefully examined for sources of irritation, and when found they should be promptly removed.

Treatment.—A successful treatment will necessarily be the one which corrects the wrongs that give rise to this disease. In one, it will be wrongs of digestion that need attention, and the patient will need to have his diet restricted and fluids prohibited at meal-times. The bitter tonics will assist in bringing about a

cure in these cases. Another will need to have hemorrhoids, pockets, fistulas, fissures, and papilla removed, or a uterus curetted or urethra dilated, before the trouble is overcome. To overlook these points is to court defeat.

During a paroxysm, the patient should be put to bed, his mind quieted as to the result of his case, and such remedies given as are especially indicated.

Gelsemium, if there be undue excitement, may be administered in full doses, a half dram or a dram to a half glass of water, and a teaspoonful every hour.

Aconite, in the small dose, is indicated where the pulse is small and rapid, and as this is the most characteristic symptom, we will find this remedy often beneficial.

Pulsatilla will be used where there is a sense of impending danger. The patient will have an anxious and frightened appearance.

Passiflora.—Where the patient is sleepless and uneasy, *passiflora* in half or teaspoonful doses will give good results.

Morphia.—Where the rapidity is extreme, and the patient alarmed, a hypodermic of morphia will give the quickest relief. As a rule, the bromides and opiates had better be omitted.

BRADYCARDIA.

Synonyms.—Brachycardia ; Slow Heart.

Definition.—Bradycardia is slowness of the heart, either normal, physiological (bradycardia), or pathological, which may be symptomatic and due to some other lesion, or it may be due to a neurosis.

Etiology.—There are some cases where the slow heart is seemingly physiological, the patient being apparently free from disease, though the pulse-rate may be only sixty. However, as many cases of organic heart disease are only made post-mortem, it may be a case of mistaken diagnosis.

The most frequent cause is the toxemia caused by the infectious fevers, especially typhoid fever, pneumonia, diphtheria, erysipelas, influenza, and acute rheumatism. Riegall, who analyzed 1,047 cases of bradycardia, where the pulse was less than sixty, found more cases from the acute fevers than from any

other cause. Baumgärtner cites a case where the pulse was only twenty-five, in the latter stage of diphtheria.

Next in frequency, according to Riegal, are wrongs of the digestive tract, 397 cases having, as a cause, some wrong of the gastro-intestinal tract. Chronic dyspepsia, either due to functional wrongs or from ulceration or cancer of the stomach, gives rise to more or less general enfeeblement, attended by a slow pulse. Wrongs of the liver act in the same way.

Bradycardia not infrequently follows confinement, owing, no doubt, to the severe exertion and the loss of so large an amount of fluid during delivery, causing exhaustion.

A slow pulse is found in diseases of the coronary arteries, sclerosis, stenosis of the aorta, and in degenerations of the myocardium.

Wrongs of the urinary apparatus may also be followed by bradycardia. Thus, in one case of nephritis with bladder complications, I rarely found the patient's pulse as high as sixty, it usually running about fifty.

Although tea, coffee, and alcohol usually give rise to tachycardia, they may also be responsible for bradycardia.

Chlorosis, anemia, diabetes, and kindred lesions, are sometimes the causes of slowing of the pulse.

Lesions of the nervous system are sometimes accompanied by slowing of the pulse, thus apoplexy, meningitis, tumors of the cerebrum and medulla, and injuries to the cord, give rise to bradycardia.

Bradycardia is sometimes associated with a neurosis, as seen in epilepsy, hysteria, mania, and paresis.

Pathology.—There are no changes characteristic of bradycardia, and when purely a neurosis, tissue changes are absent; and where structural change is found, it is rather a coincident than a result.

Symptoms.—The slow heart-beat, which is the characteristic symptom, may be temporary or permanent, and, when temporary, usually comes on suddenly and terminates in the same way, though a gradual return to the normal heart-beat is not uncommon. During an attack there may be twitching of the muscles, especially where it is epileptiform in character.

An attack may come on unannounced, or be preceded by ring-

ing in the ears, dizziness, and a sense of impending danger. There may be great prostration, which is quite pronounced when myocardial degenerations have taken place.

The pulse-rate varies, and may be from fifty, to as low as eight or ten per minute, and is weak and small.

When the heart is very feeble, the impulse may not be felt regularly at the wrist, and sometimes the radial pulse intermits every other beat, the pulse at the wrist numbering but half the number of the regular heart-beats; for this reason auscultation should always be performed while taking the pulse-rate in bradycardia.

During an attack, the patient may have repeated attacks of syncope, or he may lose consciousness early in an attack, and remain so for hours, consciousness being followed by prostration and a sense of weariness.

Diagnosis.—The diagnosis is readily made by comparing the pulse-rate at the wrist with the heart-beat, which is determined by auscultation; they should be synchronous, and less than fifty in number per minute.

Prognosis.—The prognosis depends altogether upon the cause; thus, if the result of myocardial or cerebral degenerations, the case is hopeless, death usually occurring suddenly.

Treatment.—The treatment consists of two parts: First, to overcome the paroxysm; and, secondly, to prevent its return. For the first condition we usually resort to stimulants; ammoniated tincture of valerian, from thirty to sixty drops in a little sweetened water, is often beneficial. Strychnia, from the sixtieth to the thirtieth of a grain hypodermically, will also give prompt relief.

During the interval between attacks a careful study of the patient's condition should be made, and our treatment be directed to overcoming the exciting causes.

When there are no structural changes, such as degenerations of the heart and brain, the patient may be assured that his life is in but little danger. When the slow heart is due to reflex conditions, a careful search should be instituted, and the cause removed. In one case it may be due to sexual excesses; in another to rectal troubles; while a third may be traced to wrongs of the genito-uterine system.

Some cases do better under the influence of electricity than upon internal medication.

Where the bradycardia is permanent, tonics will replace stimulants. The patient's general health will need to be restored. Good digestion must be secured in order to make a good blood. For eighteen years I have taught my classes the benefits of a dry diet in correcting wrongs of the digestive apparatus in order to secure a good blood supply. Cactus will prove beneficial in these cases.

ARHYTHMIA.

Synonyms.—Irregular Heart; Allorhythmia; Delirium Cordis; Intermittent Heart.

Definition.—Arhythmia is a condition where there is either a drop, or skip in the beat—intermittent pulse; or where the volume or force of the pulse is not regular—irregular pulse.

Etiology.—The causes of arhythmia are many, and may act directly on the heart and its innervation, or indirectly, the irritation being at some distant part. Thus, of the first, disease of the heart and blood-vessels may be named. Pericarditis may so disturb cardiac innervation as to result in an irregular heart action; while an irregular or intermittent pulse may be the first symptom to direct our attention to myocarditis, either acute or chronic. Myocardial degenerations are often attended by arhythmia, though a morbid condition of the cardiac ganglia may not be detected.

Gouty subjects suffering with arterio-sclerosis also frequently have an irregular pulse, while valvular lesions are common causes. Cardiac innervation may be disturbed by organic lesions of the brain, such as concussion, hemorrhage, meningitis, or growths, or physical influences, such as grief, fear, melancholy, etc.

Perhaps the most frequent causes are the reflexes, most prominent of which is dyspepsia, especially when flatulency is a prominent feature. Wrongs of the liver and intestines may also give rise to arhythmia. In late years the attention of the profession has been turned to wrongs of the genito-uterine and rectal systems as being responsible for irregular action of the heart. Laparotomies are not infrequently followed by arhythmia.

The toxic influence of tea, coffee, alcohol, and certain drugs,

as well as the infectious fevers, may give rise to an irregular or intermittent pulse. The excessive use of tobacco, especially cigarette-smoking, is responsible for arrhythmia, and is known as the *tobacco heart*.

Occasionally we meet with persons, apparently in good health, whose heart action is very irregular. Such a case I have in mind,

FIGURE 24. EXAMPLES OF ARRHYTHMIA.—(*Goodno.*)

the first knowledge of which was obtained during an examination for life insurance. That was some three or four years ago. I have examined the pulse and heart a number of times since, and always with the same result—arrhythmia. The patient is the picture of health, and suffers no inconvenience from the trouble.

Symptoms.—The irregularity may be in force, space, or time. The most common form is where an occasional beat is missed; it may be due to feeble ventricular contraction, the pulse-rate at the wrist being too weak to be perceptible. In other cases the intermission occurs with great regularity, each second, third, or fourth beat being absent. This pulse is known as the “*pulsus bigeminous*,” “*pulsus trigeminous*,” “*pulsus quadrigeminous*.”

In the *bigeminal pulse*, the first beat is usually the stronger, and in some cases is the only one felt at the wrist.

The *pulsus alternans* is where every other beat is strong, followed by a weak one.

The *paradoxic pulse* of Kussmal is where the beats are more frequent and feeble during inspiration than during expiration.

Delirium cordis is where the pulse shows irregularity and inequality.

The fetal heart-rhythm, or embryocardia, is where the long pulse is shortened, so that the first and second sounds are almost identical.

The *canter* or *gallop* rhythm is where in a rapid pulse, the first, though more commonly the second sound, seems split, or a reduplication of the sounds. It has been likened to the triple sound of a horse at canter.

The arhythmia may impress the system so slightly that the condition is often discovered accidentally.

The diagnosis will be made by auscultation, at the same time the pulse is being taken at the wrist, or, what is better, by the use of the sphygmograph.

Prognosis.—The prognosis depends altogether upon the conditions giving rise to it. Many times the patient's health remains undisturbed for years, the arhythmia being discovered accidentally. When due to causes outside the heart, the prognosis is more favorable; but when due to valvular or myocardial changes, it is always more or less grave.

Treatment.—While the treatment depends upon the conditions found in each case, there are certain general instructions to be given in all cases, whether functional or structural.

Tea, coffee, alcohol, and tobacco are to be discontinued, the last two especially, while the former, if taken, should be used sparingly.

The diet is of importance. Only such food as is easily digested should be permitted, and all fluids at meal-times should be discontinued. Light exercise in the open air should be practiced daily, though, should there be structural wrongs, this should be carefully regulated.

Sexual excesses should be avoided, and all habits that produce exhaustion must be abandoned.

When the arhythmia is purely functional and due to reflexes, a thorough examination must be made to find the exciting cause.

Orificial surgery many times gives splendid results by removing exciting causes. If due to mental worry or overwork, a cure may be effected by change of occupation, change of climate, and change of scenes and mode of life.

Cactus.—Where the heart's action is feeble and the impulse at the wrist scarcely perceptible, cactus will give good results.

Veratrum.—Where the heart's action is wildly irregular and the pulse full, veratrum gtt. x to xv, in half a glass of water, and a teaspoonful every one, two, or three hours, will be found beneficial.

Scutellaria is a useful remedy, where the irregularity depends upon undue nervous excitation. If there is tumultuous action it may be combined with macrotys or lobelia.

Cratægus.—This remedy helps steady the heart's action, whether the trouble is due to functional or structural wrongs.

Digitalis.—This old heart remedy would be used in similar conditions to those calling for cactus; viz., feebleness.

Strychnia.—When due to excessive venery or masturbation, strychnia, one-sixtieth grain three or four times per day, will give good results.

Macrotys, *viburnum*, and *pulsatilla* will be found useful when the irregularity is due to uterine derangements.

ANGINA PECTORIS.

Synonyms.—Stenocardia; Breast-Pang; Neuralgia of the Heart.

Definition.—Angina pectoris is an affection characterized by paroxysms of excruciating pain in the precordial region, extending into the neck, shoulder, and down the left arm, and attended by a sense of impending death. Nearly all writers agree that angina pectoris is not an independent disease, but is symptomatic of various cardiac affections, though it is occasionally due to some disturbance of the nervous system.

Etiology.—Angina pectoris is a rare disease, occurring usually after the fortieth year, and affecting mostly males. It may be divided into symptomatic, or true angina, and essential angina.

Symptomatic stenocardia is associated with cardiac affections, such as chronic myocarditis, various degenerations of the heart, aortic valvular insufficiency, stenosis of the aorta, arterio-sclerosis of the coronary arteries, and adhesive pericarditis.

Essential stenocardia is due to some disturbance of the nervous system, and is reflex. Thus it may be associated with wrongs of the stomach and bowels, the liver, uterus, ovaries, and rectal irritation. The excessive use of tobacco, and the inordinate use of coffee, tea, and alcohol, may act as producing causes. Influenza, Bright's disease, gout, and syphilis are also to be reckoned as disturbing forces.

It also occurs in hysterical patients and in emotional subjects.

Pathology.—While organic heart disease is found in all cases of true angina pectoris, there is no one lesion that is characteristic, and the same structural lesions that exist in angina, are often found without there ever having been any anginoid attacks.

The physiological explanation of anginoid paroxysms is summed up by Pepper in his work on practice as follows:

"1. Changes in the cardiac nerves have been noted by a number of observers, and angina is sometimes regarded as a neuralgia of the cardiac plexus. The close relation of the latter to the root of the aorta and of its continuation, the coronary plexus, to the coronary arteries, seems to offer an explanation of the frequency of angina pectoris in diseases of the aorta and coronary vessels. Lauceraux, Haddon, Leroux, and Rokitansky demonstrated pathological lesions of the plexus, the vagus, and the phrenic nerve, and Putjakin found alterations in the intercardial ganglia.

"2. Spasm or cramp of the cardiac muscle naturally suggested itself to Heberten and the older observers generally, but convincing proof of the existence of such a condition is lacking.

"3. Increased arterial tension and intracardiac tension seem undoubtedly the occasion of paroxysms in certain cases, as in aortic regurgitation and in the vasomotor angina of Nothnagle. The explanation would likewise apply to the cases of angina occurring in association with sclerosis of the aorta."

Symptoms.—One of the distinguishing features of angina pectoris is its paroxysmal character. In rare cases there may be premonitory symptoms, such as dizziness, ringing in the ears, nausea, or hot and cold flashes; but usually it comes on suddenly,

and without the slightest warning. The patient suddenly experiences excruciating pain of a lancinating or rending character in the precordial region, which extends to the shoulders and neck and down the left arm to the finger-tips, which sometimes become numb and cold. Occasionally the pain extends to both arms. To the intense, stablike pain is added the undefinable and fearful sense of impending death, which is unmistakably written on the face, in the drawn features, the leaden, ashen gray, or livid color, and the surface covered with a cold, beady sweat. The patient rarely cries out, though suffering untold pain. He is afraid to make the slightest movement or outcry for fear of sudden death.

The breathing is shallow and irregular. The pulse is usually tumultuous and irregular, though it may be but slightly disturbed. The paroxysms usually last but for a few seconds, though they may last for an hour or more. Generally the pain subsides as abruptly as it began, though the paroxysms frequently terminate with nausea and vomiting, or eructations of large quantities of gas; or the patient, not infrequently, voids a large quantity of pale urine or has a loose bowel movement.

Following the paroxysm, the patient seems quite exhausted, and may remain so for several days. The attacks vary in frequency from a few days' interval to several years.

In rare cases the paroxysm terminates in unconsciousness, and in still rarer cases in sudden death.

In false angina, the patient is more apt to be restless and to cry out with pain.

Diagnosis.—The diagnosis is usually not difficult. The sudden onset, the excruciating character of the pain with no outcry, the agonized expression portending death, the ashen-gray color and bedewed face, the shallow, irregular breathing, and the equally sudden termination of the paroxysm, the age and sex of the patient (the case being usually that of a male past forty years of age),—are characteristics that can hardly be mistaken for any other disease.

Prognosis.—The prognosis depends almost entirely upon the causes giving rise to it. True angina, however, is always a grave disease, and may terminate fatally during a paroxysm. The extent of the cardiac changes would, of course, determine largely the outcome. If there be extensive sclerosis of the coronary arteries, the prognosis would be unfavorable, and we might rea-

sonably expect a sudden termination of life. On the other hand, if it be neurotic in character, the prognosis will be favorable.

Treatment.—The treatment consists of two parts. 1. Prophylactic; 2, to relieve the paroxysm.

Prophylactic.—The conditions that give rise to the paroxysms should be carefully studied, and the remedies directed, as far as possible, to correct such wrongs. *Cratægus*, *cactus*, *strophanthus*, *nux vomica*, *digitalis*, *apocynum*, and the iodide of arsenic should be thought of in this connection.

The diet should be nourishing and easily digested, and all fluids restricted at meal-times. Severe physical work or exercise should be abandoned, and everything tending to greatly excite the emotions, as well as the heart's action, avoided. Dissipation of all kinds should be stopped; late hours and irregular habits corrected. Change of climate and an out-of-door life, such as would improve the general health, would be beneficial.

Lobelia.—During a paroxysm, a teaspoonful of the specific tincture of *lobelia* will give prompt relief, or we may combine with it a half-teaspoonful of *macrotys*. As to local applications, both hot and cold are recommended. Nitrate of amyl also gives prompt relief when inhaled. A perle containing two to five drops, may be crushed in the handkerchief and inhaled.

A physician of my acquaintance who suffers with angina tells me that he gets greater relief from iodide of arsenic than from any other remedy. He makes a tincture by adding ten grains of the crude drug to one ounce of alcohol, and of this he adds ten drops to a half glass of water, and takes a teaspoonful every twenty, thirty, or sixty minutes.

Nitroglycerin will also give speedy relief in some cases. The patient should be quiet for a few days following an attack.

V. DISEASES OF THE ARTERIES.

ACUTE AORTITIS.

Definition.—Acute aortitis is an acute inflammation of the intima of the aorta, similar to that met with in the endocardium.

Etiology.—Nearly all cases of aortitis are preceded by some one of the infectious diseases,—typhoid fever, diphtheria, scarlet

fever, tuberculosis, and others of the same class. Syphilis, rheumatism, and alcoholism are also important factors in producing the disease. It may be an extension of endocarditis.

Pathology.—The morbid changes are so similar to those of acute endocarditis that a minute description of the pathological changes are unnecessary. As a result of increased cell proliferation, there is a thickening of the intima, some points of which are more pronounced than others, and these local spots may be covered by fibrinous deposits. These excrescences vary from the size of a shot to that of a cherry. Ulceration may follow, and portions of these fibrinous masses floating off may give rise to embolic infarcts.

Symptoms.—The local symptoms are usually characterized by pain, more or less severe, in the precordial region, or it takes the form of a tenderness and soreness on pressure in the sub-sternal region.

Sometimes the pain is intense, resembling angina pectoris.

There is usually some fever, though never marked unless embolism occurs; in such cases, rigors, night-sweats, and a high temperature curve, with prostration, will be the additional symptoms.

Palpitation is not uncommon, and a cardiac murmur may be heard over the region of the aorta.

Diagnosis.—A positive diagnosis is almost impossible. The thoracic pain, more diffuse than in endocarditis, and the high seat of the murmur, would suggest aortitis.

Prognosis.—The prognosis is always unfavorable, as a fatal embolism or rupture of the aorta may occur without warning at any time.

Treatment.—The treatment will be along the same lines recommended for acute endocarditis, and will consist of rest, an easily digested diet, and the indicated remedy.

ARTERIO-SCLEROSIS.

Synonyms.—Endarteritis Chronica Deformans; Atheroma; Arterial Sclerosis.

Definition.—Arterio-sclerosis is an inflammatory and degenerative condition of the arterial system, primarily of the intima,

although later degenerative changes may involve the whole structure. Calcarine deposits are quite common.

Etiology.—The predisposing causes of arterio-sclerosis are old age and heredity. We may say that it is essentially a disease of old age, the large majority of cases occurring in persons past the age of forty.

When we remember the work of the arteries, however, day and night, awake or asleep, it is not surprising that, in the feeble, the arterial system ages rapidly. Occasionally we find the disease in persons between the ages of twenty-five and thirty. The inheritance bequeathed to the offspring is frequently a feeble circulatory apparatus, and it is not uncommon to find several members of a family suffering from the same disease.

In some cases it may almost be said to be a physiological condition, the result of the constant work of many years.

The causes that figure most frequently in bringing about this condition of the blood-vessels are, first, the toxins generated by certain diseases.

Syphilis may head the list, and following close in its train may be named alcoholism, its twin brother. Rheumatism, gout, and tuberculosis act in the same way, while typhoid fever, scarlet fever, diphtheria, influenza, and the malignant diseases may so impregnate the blood as to be considered important factors in producing the disease.

Overeating and Drinking.—The overfilling of the blood-vessels, that follows the ingestion of large quantities of fluids and solids, is regarded by many writers as an important factor in producing the disease. Overwork, whereby increased vascular tension results, also contributes to this condition. Athletes, boiler-makers, miners, and all who perform great and prolonged physical exertion, invite this condition.

Renal Disease.—Quite a difference of opinion exists as to the part Bright's disease plays in the etiology of arterio-sclerosis. Some believe that, by increasing the blood-pressure, these secondary results follow, and there seems good reason to believe that in some cases Bright's disease is the primary lesion from which the sclerosis can be traced. On the other hand, we find some cases of chronic nephritis which seem to be due to arterio-sclerosis.

Pathology.—The tissue-changes of the coats of the vessels may be divided into two kinds—the localized or nodular, and the diffuse—though, in most cases, there is a combination of the two.

The most frequent seat of the election is in the aorta and coronary; the splenic, iliac, femoral, cerebral vessels; the uterine, bronchial, internal spermatic, common carotid, and hypogastric following next in frequency, according to Rokitansky. The vessels of the stomach and mesentery are but seldom affected. When there is impairment of the pulmonary circulation, as in mitral stenosis, the pulmonary vessels may become sclerotic.

Localized or Nodular Arterio-sclerosis.—As a result of proliferation, infiltrated areas begin in the middle and outer coats. These nodules vary in size from that of a small shot to that of a large coin. As they increase in size, the intima loses its smoothness and becomes thickened and rough, and appears yellow over the seat of the lesion. As these changes progress, the middle and outer coats are weakened, but compensatory changes occur in the intima, which result in thickening of the intima, already noted.

Later, necrosis may occur within these atheromatous spots, giving rise to atheromatous abscesses. When these rupture upon the intima, an atheromatous ulcer is the result. In place of this, calcification may occur in these plates. Should the intima undergo softening or liquefaction, dilatation is apt to follow, giving rise to aneurism.

While these changes usually occur in the aorta, they may also occur in the smaller vessels.

Diffuse Arterio-sclerosis.—In this form the change in the coats of the vessels extends throughout the greater part of the arterial system, and in some cases invades the capillaries and veins—angina sclerosis. Even in the diffuse form, however, there is apt to be nodular areas in the aorta. The intima, though smooth, is much thickened by proliferation of the sub-endothelial tissue, while the muscle fibers in the media and adventitia may almost entirely disappear, being replaced by fatty, necrotic, and hyalin degeneration.

In senile arterio-sclerosis calcareous deposits occur, which render the vessels rigid. Where these tissue-changes involve the capillaries, there may be complete obliteration of their lumen in some places, notably the kidneys.

As a result of the narrowed caliber of the vessels, nutrition is

defective, and atrophy of the liver, kidney, and spleen may result. The increased work thrown upon the heart, however, generally results in hypertrophy of this organ.

Symptoms.—The disease may come on so insidiously, and the general health be so little disturbed, owing to compensatory change in the heart, that the disease may never be suspected during life, and only revealed on autopsy. At other times, while examining our patient for some other disease, the increased tension of the pulse, the accentuated aortic second sound, will draw our attention to the existing change in the vessels.

A uniform picture of arterio-sclerosis can not be given; for the symptoms depend largely upon the vessels involved, and we will have to consider various types depending upon the parts involved, as cardiac, cerebral, renal, and peripheral arterio-sclerosis.

Cardio-Vascular Type.—The symptoms will depend upon the degree of the arterial tension. The pulse at the wrist, as a result of thickening of the arterial walls, is hard and incompressible, and, if calcification has taken place, can not be felt on palpation. The artery in such cases feels like a rigid cord, or, if nodulated, feels like a bird's neck.

The pulse-rate is usually diminished, and, when compared with the apex-beat, shows a decided retardation, due to want of elasticity of its coats. This slow pulse is known as the "pulsus tardus."

The sphygmograph shows a characteristic tracing in the gradual ascent, the broad top, and equally gradual descent, with the dicrotic notch almost, if not entirely, obliterated. The increased arterial tension, caused by inelasticity of its walls and increased action of the heart to propel the necessary blood supply, causes hypertrophy of the left ventricle, which may be recognized by increased dullness downward and to the left, and by the accentuated ringing second sound.

When the hypertrophy is sufficient to compensate for the resistance due to rigid walls, the health is but little affected, and the disease may be overlooked. When myocardial degenerations take place, the first sound of the heart is very weak, and often a systolic murmur can be heard at the apex. Palpitation often occurs, and if slight exertion is made, dyspnea becomes marked. There is more or less constriction, and if the coronary arteries are involved, angina pectoris is not uncommon.

Cerebral Type.—The first evidence of this form may be headache, more or less intractable, melancholy, dizziness, with ringing in the ears. Attacks of vertigo, especially on slight exertion, are quite frequent. As the disease advances hemiplegia or aphasia may occur. The memory becomes treacherous and the intellectual faculties generally fail.

Renal Type.—The symptoms differ but little from those of atrophy of the kidneys, and result from a diminished blood-supply due to the sclerotic vessels.

Peripheral Type.—In this form the arteries leading to the extremities become so obstructed as to practically cut off the blood-supply, the extremities become cold and lifeless, and gangrene follows.

Diagnosis.—Where the disease is well marked, the diagnosis is usually comparatively easy. The increased *arterial tension*, thickening of the temporal, radial, bronchial, and femoral arteries, which may be recognized by the hard, cordlike feel; the hypertrophy of the left ventricle, as shown by dullness to the left and downwards; and the accentuation of the second aortic sound,—make a group of symptoms that can hardly be mistaken for those of any other lesion.

Prognosis.—As to completely curing or removing the sclerotic condition, the prognosis is unfavorable, but the patient may be assured of fairly good health and probably years of life. Nature provides against starvation of the tissues by compensatory changes in the heart, which compensation may be maintained for years. Finally, however, degenerations may occur, and the blood supply is not sufficient for the purpose of the body, and tired nature succumbs to the inevitable.

Treatment.—In the treatment of this disease we need the co-operation of the patient, and it is best to explain to him his true condition, that he may the more readily acquiesce in the restrictions placed upon him.

Alcohol and all intoxicating liquors should be absolutely forbidden, as well as the use of tobacco. Dissipation of all kinds must be avoided, and regular habits enjoined. The diet should be nourishing, but easily digested, and fluids should be restricted at meal-times and for one or two hours thereafter.

When possible, the patient will do better if taken to an equable

climate, where there is plenty of sunshine, and he can be much out of doors. The altitude must not be too great. A quiet life should be enjoined.

Where syphilis is present, Donovan's solution of arsenic, pytolacca, and echinacea will be found useful, while the iodides will be the favorite remedies with many, especially the iodide of potassium and the iodide of lithium. The lithiates for the kidneys, with an occasional saline for the bowels, will give some relief. Cactus, collinsonia, caduus marianus, strophanthus, and like remedies may be of some benefit when myocardial degenerations have taken place, though medicines in most cases will but feebly influence the disease.

ANEURISM.

Definition.—An aneurism is a circumscribed dilatation of an artery, formed by the giving away of one or more of its coats, and may be sacculated, fusiform, or cylindrical in form. Several forms or types are recognized.

(a) The *true* aneurism, is where the sack is formed of one or more of its coats.

(b) The false aneurism is where there is a rupture of the coats, and the blood is found in the adjacent tissues.

(c) A dissecting aneurism is where there is a rupture of the intima, and the blood burrows, or dissects, between the walls of the vessel. The aorta is the usual seat, and may be traversed its entire length.

(d) A miliary aneurism, so named from its minute size, is found in the cerebral vessels.

(e) An arterio-venous aneurism is where the dilatation occurs in veins, the result of a communication being established with an artery.

These various forms are termed axial, when the entire circumference of the vessel is involved in the dilatation, and peripheral when the dilatation involves but one side of the artery.

Etiology.—Age and sex are predisposing factors, the disease occurring between the ages of thirty and fifty, and mostly in men. An enfeebled condition of the walls of an artery is necessary for the development of an aneurism. This may be congenital or it may be acquired. The most frequent cause is arterio-

sclerosis, especially during the early stage, before compensatory changes have taken place.

Syphilis, gout, rheumatism, alcoholism, lead poisoning, uric acid, Bright's disease, and diabetes, are conditions that enfeeble all tissues, the arterial coats not excepted.

Severe exertion or strain is also responsible for a weakening of the vascular walls, and how much is due to strain, and how much is due to syphilis, in soldiers and sailors, is difficult to state, though each figures quite extensively.

Traumatism should be considered as an etiological factor, and heavy body bruises or blows upon the chest would tend to weaken vascular walls.

Embolism.—The plugging of an artery by an embolus is apt to result in the development of an aneurism on the proximate side of the obstruction.

Mycotic Aneurism.—More recent examinations tend to show that, in some cases, the weakened condition of the walls is due to micro-organisms; at least an abundant product of micro-organisms have been found present in the aneurismal sac.

Pathology.—There is generally degeneration of the arterial walls, arterio-sclerosis being frequently present. In some the intima and media have been destroyed, the adventitia being the retaining wall. The blood in an aneurismal sac may become laminated and of a fibrous character, thus restoring the arterial wall. There is generally hypertrophy of the heart due to arterio-sclerosis.

Aneurism of the Thoracic Aorta.—Of over nine hundred cases of aneurism collected by Crisp, forty-five per cent were found in the thoracic portion of the aorta, and eleven per cent in the abdominal aorta, or about seventy-five per cent of all aortic aneurisms were located in the thoracic portion, over fifty per cent being found in the ascending portion, and diminishing in frequency as the distance from the heart increases.

Symptoms.—The symptoms depend largely upon the size and location of the aneurism. If small, the disturbance is so slight that it is not recognized; but as it increases in size and interferes by pressure, characteristic and distressing symptoms make their appearance. Should the aneurism be located where there is plenty of room for development without pressing upon important parts, it may attain a large size without local or systemic disturbance.

Since location determines the symptoms, we will consider them according to the part affected.

(1) *Aneurisms of the Ascending Portion of the Arch.*—If the aneurisms are small and near the sinuses of Valsalva, they may remain unsuspected till a sudden termination of life reveals a ruptured aneurism in the pericardium.

When located above the sinuses, earlier and more pronounced symptoms are present. Thus, if the aneurism be located on the right or convex border, the pressure would be against the superior venæ cavæ, which would result in congestion and edema of the upper extremities, or the pressure may involve only the subclavian, resulting in enlargement and edema of the right arm.

They may attain very great size, pushing out into the pleura or forward against the sternum and ribs, causing erosion, and finally appearing beneath the skin as pulsating, bluish tumors. They may press against the right recurrent laryngeal nerve, which will be followed by dyspnea and apnea.

Should the aneurism be located on the left or concave border, the pressure would cause displacement of the heart, forward, downward, and to the left. Pressure on the inferior venæ cavæ would cause dropsy of the lower extremities.

Death is usually sudden, the warning symptoms being intense pain, cyanosis, and dyspnea. It may rupture into the pleura, pericardium, superior venæ cavæ, or externally, according to location.

(2) *Aneurism of the Transverse Portion of the Arch.*—The most pronounced symptoms occur when developed in the transverse portion, owing to the small amount of space afforded for their development, and consequently they exert greater pressure upon neighboring parts.

It may extend in the usual direction, backward, and press in against the trachea, causing a ringing paroxysmal, metallic cough, with more or less dyspnea, or, pressing against the esophagus, cause difficulty in swallowing. The tumor may press against the bronchi, which embarrasses respiration, and is attended by severe attacks of paroxysmal coughing, with watery or muco-purulent expectoration. Marked dilatation of the bronchi may follow. When very large, the tumor may press against the lung, giving rise to severe pulmonary symptoms, and, in time, to suppuration, termed by Osler, aneurismal phthisis.

The left recurrent laryngeal may be affected with the same

result as where the right was involved; viz., cough, dyspnea, and aphonia. The aneurism may encroach upwards, involving the carotid and subclavian on the left side, or the carotid and innominate on the right. The sympathetic may be involved by pressure, resulting in dilatation of the pupil where the irritation is slight; but where more severe, paralysis may follow, with the contracted pupils. Where the thoracic duct feels the encroaching tumor, general atrophy follows.

When the aneurism develops on the anterior portion of the arch, it encroaches upon the sternum, and by continued pressure may cause severe erosions. The aneurism may develop to an enormous size, encroaching upon both the right and left pleura, crowding both the lungs.

(3) *Aneurism of the Descending Portion of the Arch.*—The pressure is mostly backward against the vertebræ, extending from the third to the sixth dorsal, oftentimes causing erosions. It may make its way to the scapula, and project as a pulsating tumor. There is sometimes compression of the cord, which is attended by great suffering. The esophagus and bronchi may be pressed against, with dysphagia and bronchiectasis, to which reference has already been made.

The descending portion of the thoracic duct is generally involved near the diaphragm, the tumor lying against the lower dorsal, which may be severely eroded.

Wherever located, pain is always a distressing and prominent symptom. If the aneurism is of sudden development, as sometimes occurs under great physical exertion, the patient experiences a sudden "giving way," due to rupture of the tunica media, and attended by a sharp pain in the upper part of the chest.

The pain in later stages may be the result of stretching of the nerve filaments in the walls of the aorta, or it may be due to pressure upon the adjacent parts. Where there is erosion of the bone, as of the sternum or vertebræ, the pain is of a boring character, and causes great suffering. In rare cases the tumor may develop to great size, with but very little pain, even where there has been erosion of the bone.

Physical Signs.—The physical signs, like the general symptoms, depend upon the size and location of the tumor; if small and deep-seated, a physical examination may fail to reveal the tumor.

Inspection.—One of the most important and characteristic signs is a pulsating tumor of the chest, and, though there may be no protrusion of the walls of the chest in the early stage, by standing at the patient's side, and having the light strike him obliquely, a pulsation synchronous with the systols of the heart may be revealed.

If the aneurism be of the ascending arch, the pulsation will be to the right of the sternum and in the second or third inter-space. If located in the transverse portion, the sac will be behind the manubrium, though it may be seen pulsating at the supra-sternal notch. Where the innominate artery is the seat of the aneurism, the pulsation will be seen above the second rib extending into the neck.

If the descending portion be involved, the pulsating tumor will be seen to the left of the spinal column, extending into the scapular region.

In some cases there is marked bulging of the tumor, caused by erosion of the sternum or ribs or perforation of the back. They vary in size from a billiard-ball to a cocoanut. The skin covering the tumor is thin, smooth, and stained a dark-red color. If the aneurism be large, the apex-beat will be displaced downwards and to the left.

When there is compression of the superior cava, there will be cyanosis of the head, upper chest, and arms. Where there is compression of the inferior cava, the abdominal walls and legs will be congested and dropsical.

Palpation.—When inspection fails to reveal pulsation, the tumor is deep-seated, and may be recognized by palpation. By placing one hand over the sternum and the other over the spine, a strong, heaving pulsation is imparted to the hand, radiating in every direction, and known as the *expansile* pulsation. When the tumor has perforated the chest, and the hand can grasp the tumor, this expansile character is much more marked.

One of the signs of great value in aneurisms is the diastolic shock imparted to the hand on palpation, and is synchronous with the closure of the aortic valves. This usually occurs when the aneurism is at the root of the aorta. Where there is dilatation of the arch, a systolic thrill is sometimes present.

Percussion.—Where the aneurism is deep-seated, percussion will most likely give negative results; when the tumor reaches

the chest-wall, however, an abnormal area of dullness is heard, the location depending upon the part affected; thus, if the aneurism be located in the ascending portion of the arch, the dullness will be to the right of the sternum and above the third rib. If situated on the transverse portion, the dullness will be over the sternum and to the left; while if on the descending portion, it will be heard in the left interscapular region. The sound is peculiarly flat.

Auscultation.—Auscultation may reveal murmurs that are characteristic, or give negative results, depending upon the thickness of the laminæ of fibrin. The most characteristic sign is a systolic murmur heard over the area of dullness, and transmitted to the carotids, and if there be aortic insufficiency a diastolic murmur will also be heard. In large aneurisms of the arch a loud, ringing, accentuated second sound is a sign of diagnostic value.

Drummond speaks of a systolic murmur heard in the trachea, due to the expulsion of air at each distention of the sac.

A physical sign of importance is a slowing of the pulse in the arteries beyond the aneurism, the sac acting as a reservoir, breaking the force of the systole. When the sac is very large, there will be an absence of pulsation in the abdominal and femoral arteries from the same cause.

The two radial pulses may show a marked difference in time; thus, if the aneurism be situated in the transverse portion of the arch and the innominate is not involved, the pulse at the right wrist and in the neck is strong and almost synchronous with the systole of the heart, while the pulse of the left wrist is small, weak, and retarded.

Surgeon-Major Oliver described what at one time was regarded as a very valuable sign, a *tracheal tugging*. The patient is directed to sit or stand in an upright position, close the mouth, and elevate the chin. The cervical cartilage is then grasped between the finger and thumb and elevated till the trachea is tense, when there will be a downward dragging or tugging at each systole. When taken with other signs it is valuable; but alone, it will not be of much weight, as it is sometimes found in health and in other diseases.

Diagnosis.—The diagnosis of an aneurism is sometimes quite difficult, if not impossible. In some cases the symptoms are so obscure and the aneurism so deep-seated that, after the most care-

ful examination, the lesion may not be discovered. This is especially true if the aneurism be small and located in the sinuses of Valsalva.

If the patient's occupation has required great physical exertion, and his age is between thirty and forty-five, and should there be a history of arterio-sclerosis coupled with obscure thoracic pains, sudden attacks of intense pain and anginoid in character, or pain radiating along the bronchial plexus or intercostal nerves, we would think of aneurism.

If to these symptoms are added dyspnea, dysphagia, aphonia, and cough, either of a dry, ringing, metallic character—laryngeal, or loud, and hoarse,—bronchial, with profuse expectoration; or if there be edema and congestion of the upper extremities, and if a physical examination reveals dullness in the aortic region, a systolic murmur, and a systolic and diastolic accentuation of the second sound, change in the character and time of the pulse, and the marked difference between the left and the right pulse, and if to all these symptoms be added, the trachial tugging, the diagnosis is assured.

A differential diagnosis has to be made between aneurisms and solid tumors, pulsating empyema, pulmonary tuberculosis, and abnormal pulsations of the aorta. The tumors that are most likely to be confused with aneurisms, are cancers, sarcomas, and glanular enlargements of the mediastinum.

If we bear in mind, however, that while tumors and enlarged glands may give rise to all the pressure symptoms of aneurisms, abdominal pulsation is either lacking, or, if present, is quick, not slow and expansive.

There is also an absence in growths, of the systolic thrill on palpation, and the diastolic shock is missing. On auscultation, if there be a tumor, the systolic murmur is either absent or very faint, and accentuation of the second sound is not perceptible. There is also uniformity in the radials, and trachial tugging is not present. If the growths be malignant in character, or a sarcoma, there will be greater evidence of malnutrition, more emaciation, and that peculiar appearance designated as cancerous cachexia. The pain is more constant, and there is enlargement of the axillary and cervical lymphatics.

Pulsating Empyema is not so circumscribed, but covers a more superficial area, is not expansile, and is produced by respiratory movement.

Auscultation fails to reveal the characteristic murmur or diastolic shock and there is no retardation of the radial pulse. On the other hand, chills, hectic fever, night-sweats, and emaciation, characteristic symptoms of empyemia, render the case a plain one.

Pulmonary Tuberculosis.—Where an aneurism presses a bronchus, causing dilatation, attended by cough and profuse expectoration, followed by fever and emaciation, the symptoms may be mistaken for phthisis; in the latter, however, the history, the night-sweats, greater fever, and emaciation, will enable us to distinguish the one from the other.

Abnormal Pulsation in the Aorta.—We meet with abnormal pulsation in neurotic patients, generally females, and occasionally in retraction of the lungs.

Curvature of the spine may give rise to displacement of the aorta, with forcible pulsation. When these conditions are present, there is one marked difference from aneurisms; namely, absence of retardation of the pulse and the characteristic *expansile* pulsation. The perfecting of the use of the X-ray will most likely render the diagnosis of aneurism positive.

Prognosis.—The outlook in thoracic aneurism is always serious, and though recovery may take place spontaneously, and by treatment, the tendency is towards a fatal termination, and recoveries are very rare.

Rupture and sudden death may occur at any moment. According to Lebert, who examined a large number of cases, the duration of life, from the time the first distinct symptom made its appearance until death, was from fifteen to eighteen months. The patient's occupation and habits will determine to a certain extent the length of life. Where an even, quiet life is led, the patient may live for years.

Treatment.—To effect a cure we must resort to such measures as will promote coagulation of the blood and bring about contraction of the sac, and any treatment that favors this condition will be highly beneficial.

To accomplish this, the late Dr. Tufnell, of Dublin, advocated rest in bed and a dry diet. By these means the fluids in the system are reduced to the minimum, arterial tension is lessened, the amount of fibrin increased and the number of heart-beats greatly lessened. Tufnell's diet list was very rigid and consisted of the following bill of fare: For breakfast, two ounces of bread and

butter and two ounces of milk; for dinner, two or three ounces of meat and two ounces of milk or claret; for supper, two ounces of bread and two ounces of milk.

There is no doubt that rest in bed and the above rigid diet would greatly lessen the number of heart-beats and lessen the quantity of fluids in the body, but there are few patients who would submit to such a quiet life and so rigorous a diet; indeed it is not necessary to go to quite such extremes, though the patient must lead a quiet life, and his fluids should be restricted.

Tea, coffee, and alcohol should be forbidden, and his allowance of water reduced to eight or ten ounces per day.

To produce coagulation of the blood, the introduction of fine wire, horsehair, or fine catgut has been practiced with some degree of success. Galvano-puncture, electrolysis, and the injection of styptics have been used for the same purpose. There is always some danger, however, attending these local measures, since coagulated particles may float off and give rise to embolism. Ergotine dissolved in water or glycerin has been injected directly into the sac, in the hopes of inducing contraction in the smooth muscles of the walls of the aneurism.

Iodide of potassium has been largely used by the old school as a remedy for aneurism.

The pain, when very severe, will call for morphia. The calcium salts are thought to influence the process of clotting, and may be used, though too much reliance must not be placed in their efficacy. The natural mineral waters may be freely used to prevent constipation.

ANEURISM OF THE PULMONARY ARTERY.

Aneurism of the pulmonary artery is very rare, and is usually sacculated or fusiform; extreme dilatation, however, is not uncommon, and may result from mitral stenosis, phthisis, emphysema, or any affection that obstructs the lesser circulation. When extreme, there will be insufficiency of the semilunar valves.

Symptoms.—If the aneurism be large, the symptoms will be similar to those of aneurism of the thoracic aorta; usually, however, the aneurism is small and the symptoms are negative. If there be extreme dilatation, there will be regurgitation into the right ventricle, which will be attended by cyanosis, dyspnea, and more or less cough.

Physical examination reveals a pulsation in the second or third interspace and to the left of the sternum. On palpation, the systolic pulsation is attended by a thrill and diastolic shock.

Percussion reveals a dull or flat sound, over the area of pulsation (second interspace). We are to remember, however, that where there is retraction of the lung, the percussion note will be dull, though neither dilatation nor aneurism exist.

Auscultation may reveal a loud, superficial, systolic murmur to the left of the sternum, over the second interspace.

The prognosis is unfavorable, and the treatment will be on the same principles as outlined for thoracic aneurism.

ANEURISM OF THE CORONARY ARTERY.

The coronary artery may be the seat of aneurism due to weakened condition of its walls, the result of arterio-sclerosis. It is very rare, however, and not discoverable during life.

ANEURISM OF THE ABDOMINAL AORTA.

Aneurism of the abdominal aorta arises from the same causes that give rise to aneurism of other parts. It occurs far less frequently than thoracic aneurism, however, and is found far more often in men than in women. It is usually saccular or fusiform, and located near the celiac axis.

Symptoms.—The most common as well as constant symptom, is pain, which may be sharp and lancinating in character, extending to the back and around the abdomen, or it may be of a dull, boring character, when there is erosion of the vertebra. There is nearly always some gastric disturbance, attended by vomiting and pain, and jaundice is a common symptom. When the pressure is upon the liver, spleen, or kidneys, congestion of these organs follows, with the usual accompanying symptoms.

If there is erosion of the vertebra, paraplegia may follow. In rare cases the aneurism may perforate the diaphragm, and rupture into the pleura or lung. When it arises from the anterior wall, it may form a well-defined tumor. There is generally retardation of the femoral pulse.

Physical Signs.—Inspection may reveal pulsation in the epigastric region; and if the aneurism be on the anterior wall, a well-defined tumor is visible. The pulsation is heaving and expansile, and if near the diaphragm it is double; a diastolic shock from the heart may be recognized. A systolic thrill is sometimes noticeable.

Percussion reveals an abnormal area of dullness.

On auscultation, a soft bruit or murmur can usually be detected.

Diagnosis.—If we bear in mind that the pressure of a tumor that can be grasped in the hand, and which has a heaving, expansile pulsation, is the only positive diagnostic symptom, we will avoid many errors. The throbbing aorta occurs in neurasthenia and in anemia, and must not be mistaken for aneurism. It sometimes happens that a tumor of some of the abdominal viscera will be lifted with each abdominal pulsation, and may simulate aneurism.

If the patient be examined in the knee-chest position, however, the tumor will drop forward, when the pulsation ceases. It is also noticeable that the pulsation is not expansile.

Prognosis.—The prognosis is exceedingly grave, though very rarely, a case heals spontaneously. Sudden death may occur from rupture into the pleura, peritoneum, or intestines, or it may occur by obliterating the lumen by clots. Sometimes death is the result of paralysis induced by erosion of the vertebra.

Treatment.—The treatment of abdominal aneurism will be on the same principle adopted for thoracic aneurism. Firm pressure for hours, the patient being anesthetized, has been practiced with some degree of success, though there is always danger of rupturing the aneurism by this means.

ANEURISM OF THE CELIAC AXIS.

This sometimes occurs in connection with aneurism of the upper portion of the abdominal aorta. Aneurism of its branches may occur, though it is quite rare. The symptoms of aneurism of the splenic and hepatic arteries are somewhat vague or similar to wrongs of the spleen and liver.

The tumor rarely ever reaches a large size, and the diagnosis is made post-mortem.

ARTERIO-VENOUS ANEURISM.

Definition.—Arterio-venous aneurism is an abnormal communication between an artery and vein, and known as *varicose aneurism* when a sac lies between the two.

When the communication is direct, the sac being absent, it is known as aneurismal varix. Venesection is generally responsible for this condition, the piercing of an artery and vein occurring during the operation. This accounts for the frequency with which it occurs at the bend of the elbow. Accidental puncture may occur at other parts.

Symptoms.—Sudden distention of the veins of the upper part of the body, cyanosis, and edema are the most characteristic symptoms.

Auscultation reveals a continuous thrill and buzzing, whizzing or humming murmur, intensified during systole.

Treatment.—When the aneurism is superficial, surgical measures will correct the difficulty; but if it be a thoracic arterio-venous aneurism, the same treatment will be pursued as recommended for the arterial variety.

PART IV.

DISEASES OF THE DIGESTIVE SYSTEM.

I. DISEASES OF THE MOUTH.

ACUTE STOMATITIS.

Definition.—An acute inflammation of the mucous membrane of the mouth, occurring most frequently in children, though no age is exempt.

Etiology.—The causes that give rise to stomatitis are generally local, though it may rise from gastric or intestinal derangements, chemical and mechanical irritants being the most common, such as sharp edges of broken or carious teeth; very hot drinks, such as tea and coffee; highly spiced food; tobacco, both chewing and smoking; irritating dust inhaled at certain work, such as lime, coal, marble, and workers in various minerals; the corrosive acids or alkalies; and sometimes from the decomposition of food lodged between the teeth, and fetid cavities. It may also be caused by dentition, or follow the eruptive fevers.

Symptoms.—The inflammation is attended by the following symptoms: heat, pain, redness, and swelling. At first the mouth is dry and hot, with a burning, smarting sensation; but soon secretion is established, and mucus and saliva are found in excess. This condition is often called catarrhal stomatitis. Mastication is painful, and hot drinks, and coarse food give rise to pain. The tongue is coated, the breath is fetid, and the child becomes peevish and cross. In a few days the disease loses its angry character, the inflammation becomes subacute, while the mouth is bathed in a ropy, offensive mucus.

Diagnosis.—The diagnosis is easily made. The red, inflamed character of the mucous membrane; the tenderness, the burning sensation, dry mouth, followed by hypersecretion of mucus, are symptoms which can not be mistaken for those of any other trouble.

Prognosis.—The prognosis is favorable, the disease usually giving way in a week or ten days.

Treatment.—This is simple and quite successful. After thoroughly cleansing the mouth with a weak solution of pyrozone, or a wash of boracic acid, or, better still, a solution of hydrastin and chlorate of potassium, we prescribe phytolacca ten drops, and water four ounces; a teaspoonful every hour. As a mouth-wash I know of nothing to equal the phosphite of hydrastin and chlorate of potassium. If there are any gastric or intestinal complications, remedies should at once be used to correct these wrongs. If there should be fever, combine aconite with the phytolacca, and give every hour. The mouth should be kept sweet and clean. The diet should consist of liquid food; warm drinks are more agreeable than very cold or very hot fluids.

APHTHOUS STOMATITIS.

Synonyms.—Follicular Stomatitis; Disseminated Vesicular Stomatitis; Fibrinous Stomatitis.

Definition.—A variety of stomatitis, characterized by small, round, white patches upon the mucous membrane of the tongue; gums, and cheeks. Small vesicles appear upon an inflamed base, and later form small ulcers.

Etiology.—This variety usually occurs in children under three years of age, though it may occur at any period of life. It may accompany the acute infectious diseases, and occasionally occurs as an epidemic. An impoverished condition of the blood favors the disease, as well as poor hygienic surroundings; gastro-intestinal disorders also predispose to this lesion, while Strümpell believes the milk from cows suffering from the hoof and mouth disease, is an exciting cause.

The time of the year may also be considered a factor in this disease, spring and fall being the seasons when colds prevail and intestinal disturbances are common.

Symptoms.—The mouth is exquisitely tender, and, when nursing or attempting to eat, a burning sensation follows. As a result, the child is peevish and fretful. The tongue is furred, the breath is fetid, and a slight fever is occasionally noted; there may be some gastric or intestinal disturbance.

On inspecting the mouth, small vesicles are seen on the inner surface of the lips, and along the sides of the tongue, and near the frenum; they may also be found on the cheeks; these rupturing, small, white patches, surrounded by a red base are observed, which may later ulcerate. There is a free secretion of saliva and mucus, which, in the infant, dribbles from the mouth, and in older patients necessitates frequent spitting. There may be enlargement of the submaxillary glands.

Diagnosis.—The small vesicles upon the sides of the tongue and mouth, followed by white or yellowish patches, make the diagnosis plain.

Prognosis.—The disease usually yields to treatment in a week or ten days, though some cases prove very intractable, with a tendency to recur at intervals.

Treatment.—Cleanliness is of the greatest importance, and the mouth should be rinsed with lukewarm water after each feeding. In bottle-fed babies, great care must be taken that the bottle and nipple are kept sweet and clean, the nurse being instructed to scald out the bottle after each nursing, and lay in plain cold water, or in soda or lime water.

For a mouth wash, potassium chlorate and hydrastis, or boracic acid, will prove among the best. Painting the patches with equal parts of thuja and water is also frequently beneficial. Internally, specific phytolacca is the remedy par excellence. If there is fever, add aconite to the above. Where the tissues are *bluish* and the breath bad, echinacea will prove more effective. Where the tongue is coated with a moist, yellow, pasty coating, potassium chlorate and hydrastis one dram, to water four ounces, a teaspoonful every hour, will give relief and the best results. Where there is hypersecretion of saliva, specific belladonna ten drops, to water four ounces, will be indicated. Dr. Webster likes the action of jaborandi for this same condition. In the adult, where the ulcers persist, apply bluestone direct to the ulcers.

THRUSH.

Synonyms.—Parasitic Stomatitis; Stomatitis Mycosa.

Definition.—A specific fungous disease of the buccal mucous surfaces, characterized by whitish or yellowish deposits, in which are found the *saccharomyces albicans*.

Etiology.—Predisposing causes are such as furnish a soil suitable for the propagation of the thrush fungus; such as tuberculosis, congenital syphilis, or any disease whereby the blood is impoverished. In bottle-fed children, when cleanliness is not observed, and the bottle and tube contain sour milk; in adults, typhoid fever, diabetes, and carcinoma, are fruitful causes.

The specific cause is the fungus above mentioned (*saccharomyces albicans*), which thrives in the changed condition of the mouth secretions, fermentation having changed the normal alkaline secretion to acid.

Symptoms.—The child is fretful and peevish, the result of the burning pain, and frequently a diarrhea, with greenish stools, occurs. On inspecting the mouth, we find the mucous membrane dry and of a dusky red color, upon which are seen the thrush spots in the form of white patches, first upon the tongue, rapidly extending to the lips, cheeks, pharynx, and sometimes to the esophagus and stomach.

When the extension is so general, a troublesome diarrhea exists. The saliva, after a few days, becomes profuse, but is acid in character; in fact, we find an acid saliva in nearly all forms of stomatitis.

Diagnosis.—The dryness of the mouth in the early stage, the white patches, which can be readily removed without bleeding, the absence of the yellow ulcers seen in aphthous stomatitis, makes the diagnosis comparatively easy. The presence of the fungus, revealed by the microscope, makes the diagnosis positive.

Prognosis.—This is favorable unless there is marked cachexia, in which case it may be quite stubborn.

Treatment.—Remembering that the fungi thrive in an acid medium, our mouth-washes will be selected to correct this condition; hence the alkalis are used; bicarbonate of sodium, boracic acid, potassium chlorate, etc. After each feeding, the mouth is to be carefully washed, every particle of food being removed.

Sweets of all kinds are to be avoided, as they favor fermentation. The general health is to be improved by adopting more favorable hygienic conditions. Plenty of fresh air and wholesome and easily digested food will be important factors in the cure.

Phytolacca, echinacea, nux vomica, rhus tox., and others of like character will be used. Inunction of quinine and lard will improve the condition of the skin, and act as a tonic. In all these cases we are not to overlook the great fact that the impoverished condition of the blood furnishes the soil for the development of the parasite, and remedies are to be used which will give us a better blood, and consequently a more healthy body. When we fail in this respect, the local trouble persists in spite of local treatment.

ULCERATIVE STOMATITIS.

Synonyms.—Fetid Stomatitis; Putrid Sore Mouth.

Definition.—A stomatitis characterized by the formation of ulcers on the gums and cheeks, attended by an offensive breath.

Etiology.—This is a disease of childhood, though it is sometimes met with in the adult. The predisposing causes are similar to those of aphthous stomatitis and thrush; viz., poor hygienic conditions, bad air, light, and food; poor clothing, damp and filthy quarters, and all conditions that impoverish the blood. Neglect of the mouth, and bad teeth, also favor the disease. No doubt the infectious fevers favor the generation of the virus whatever that may be. It is most likely due to a specific germ; but, as yet, the specific cause has not been discovered.

Symptoms.—"On examining the mouth, we find the gums red, swollen, and spongy, and where the ulcer is situated, a grayish, pultaceous material, on removing which, the surface is raw and bleeding. It generally commences on the front part of the gums, but gradually passes between the teeth, affects the posterior surface; continuing, it destroys the gum both before and behind, and passing to the lips and cheeks adjacent, forms irregular ulcerations, covered by the same material. If it continues long, the tongue is swollen, and is marked by the teeth; the saliva becomes thick and very offensive, often streaked with blood, the gums bleeding at the slightest touch. The stomach is usually

deranged, the bowels irregular, the tongue covered with a dirty coat, and more or less febrile action." (Scudder.)

Diagnosis.—The soft, spongy condition of the gums, the characteristic ulceration, the foul breath, the vitiated saliva, together with the cachectic appearance of the patient, renders the diagnosis easy.

Prognosis.—The disease usually yields readily to treatment, and even in those cases due to impoverished blood a cure will result in a few weeks under specific medication.

Treatment.—After thoroughly cleansing the mouth with pyrozone, boracic acid solution, or listerine, and the removal of carious teeth, we put the patient on potassium chlorate and hydrastis, both for its local and systemic use. It will fit more cases than any other remedy. For the *nasty, dirty, pasty* coating upon the tongue, which tells of sepsis, use sodium sulphite. If the sub-maxillary glands are involved, phytolacca will prove our best remedy. When the tissues are dusky, baptisia or echinacea will prove the better agents.

The ulcers may be touched with thuja, or with nitric acid, applied on a pine pencil. The gastric and intestinal disturbance may call for nux vomica or small doses of podophyllin. Drop doses of Howe's acid solution of iron is a good tonic, as well as quinia and hydrastis. To harden the spongy gums, an application of tincture of myrrh and glycerin, three times per day, is useful. The diet should be nutritious and given in fluid form.

MERCURIAL STOMATITIS.

Definition.—An inflammation of the mouth and salivary glands, due to the specific action of mercury. It may become phagedenic, destroying muscle, cartilage, and bone.

Etiology.—The disease is caused, as the name indicates, by the influence of mercury upon the system. Some people are extremely susceptible to this drug, and the smallest dose will produce ptyalism; hence, an occasional case is seen, notwithstanding the heroic doses of fifty years ago have been discarded by the profession.

Symptoms.—"The mouth feels unusually hot, and is sometimes sensible of a coppery or metallic taste; the gums are swol-

len, red, and tender; ulcers make their appearance, and spread in all directions; the saliva is thick and stringy, and has that peculiar, offensive odor characteristic of mercurial disease; the tongue is swollen and stiff, and there is some fever, with derangement of the secretions. The disease progressing, it destroys every part that it touches, until the lips, the cheeks, and even the bones, have been eaten away before death comes to the sufferer's relief." (Scudder.)

Diagnosis.—The history of the case, mercury having been taken, the metallic taste, and the character of the ulcers, makes the diagnosis positive.

Prognosis.—The prognosis is usually favorable, though the teeth may be sacrificed, and in severe cases the periosteum is destroyed.

Treatment.—Chlorate of potassium is almost a specific for this form of stomatitis. It should be combined with hydrastis, and used both locally as a wash and also for its systemic effect. The ulcers may be touched with dilute sulphuric or nitric acid. Dr. Webster speaks very highly of jaborandi in small doses. It is doubtful if phytolacca is as beneficial in this variety as in the other forms. Alkaline washes and pyrozone should be freely used. The diet should be nutritious, in fluid form, and unirritating. It is hardly necessary to add, that the exciting drug should be at once withheld as soon as the first evidence of ptyalism is noticed.

MEMBRANOUS STOMATITIS.

Synonym.—Croupous Stomatitis.

Definition.—An inflammation of the buccal mucous membrane, characterized by the formation of a false membrane.

Etiology.—There seems to be quite a difference of opinion as to the specific cause of this form of stomatitis. Some regard the Klebs-Loeffler bacillus as responsible for it, while others contend that gonorrheal or syphilitic infection in the new-born is the primary lesion that gives rise to the disease.

Symptoms.—This form of stomatitis appears in the shape of small, irregular patches, of a grayish white color, the parts surrounding being red, painful, and hot. Of this Scudder says:

"The breath is fetid, and the submaxillary glands enlarge.

As the disease proceeds, the patches of membranous exudation extend, become more or less detached, and are succeeded by others, and the intervening surfaces are red and swollen. The tongue is swollen and the mouth continually open, allowing the escape of altered saliva. The enlargement of the lymphatic glands increases, the face swells, the breath becomes more fetid, and the pulse more quick and rapid, and generally soft, open, or full and weak." "The disease sometimes extends back to the throat, and even involves the mucous membranes further, sometimes occasioning imminent danger. It may become chronic, and continue for weeks or months."

Diagnosis.—This is made by the membranous character of the patches.

Treatment.—"With small doses of aconite we associate *phytolacca*, *rhys*, or *baptisia*, as indicated. When the tissues are full, the first; if contracted and hot, with vivid redness, sometimes fissured and bloody, the *rhys*; and if there is dusky discoloration, the *baptisia*. The remedies are used in the ordinary small doses, and the *phytolacca* and *baptisia* may also be used as washes. When the tongue is broad, pallid, and dirty—a rare case—sodium sulphite is the remedy.

As a local application, the hydrochloric acid with honey, one part to three, four, or six, will be found as good as anything; it should be applied with a small piece of sponge attached to a stick to the membranous exudations, being careful to reach them all. At the same time a saturated solution of potassium chlorate, with a small portion of glycerin, may be frequently used. An infusion of *cinchona*, acidulated with hydrochloric acid, has been recommended subsequently; but I would prefer the decoction of *rumex*, *alnus*, and *quercus rubra*."

GANGRENOUS STOMATITIS.

Synonyms.—*Cancrum Oris*; *Noma*; *Water Cancer*.

Definition.—Gangrene of the cheek and gums, affecting delicate and sickly children, rarely the adult, and characterized by a rapid destruction of tissue. The disease is generally fatal.

Etiology. — **Predisposing Causes.** — *Age.* — The disease usually occurs between the ages of two and six years, and is more frequently found in girls than in boys.

Climate.—It prevails in low moist countries, especially in Holland.

Infectious Fevers.—While the disease may be primary, it frequently follows the infectious fevers, especially measles, scarlet fever, typhoid fever, typhus fever, and pneumonia. In fact, any disease that lowers the vitality, as well as poor hygienic conditions which impoverish the blood, predispose to noma.

The Exciting Cause.—Mercurialization has been thought, by many, to be responsible for this destructive disease, and from the similarity of symptoms of this and mercurial stomatitis, there are strong grounds for the belief. The microbic theory has its adherents, but as yet no specific germ has been discovered.

Symptoms.—The disease commences with an indurated swelling, usually near the angle of the mouth. On grasping the swollen mass between the finger and thumb, we get the sensation that the induration extends through the entire cheek. Externally the affected side is swollen, and presents a blanched, glassy appearance. Internally, there is a dusky redness, in the center of which the ulcer rapidly forms; phagedenic in character, it rapidly destroys tissue, and may perforate in three or four days, though rarely before seven or eight days. The entire cheek may be involved, the tissues melting away like a snowball in the sun. From the ulcer an ichorous fluid is discharged, and shreds of tissue slough off and are mixed with the changed and vitiated saliva. The odor is peculiarly fetid and that of gangrene. The submaxillary glands are always swollen; usually there is but little pain.

As the disease progresses, the temperature rises to 104° or 105°; the pulse, though feeble, is rapid. In swallowing, more or less of the ichorous fluid and shreds of the gangrenous tissue enter the stomach, and a troublesome diarrhea often follows, or the patient, poisoned by the inhalations from his own necrotic cheek, finds septic lobular pneumonia complicating the already overburdened system; the prostration increases, the mind wanders, or the patient sinks into stupor, and succumbs to general sepsis. Death may occur in a few days, or be delayed three or four weeks. In exceptional cases, the patient recovers, leaving great disfigurement from cicatrization of tissue; the disease is generally confined to one side.

Diagnosis.—When fully established, the diagnosis is not difficult. The hard, indurated nodule near the angle of the mouth, the phagedenic character of the ulcer, the gangrenous tissue and foul odor, and later the perforation, can hardly be mistaken for any other variety.

Prognosis.—This is a very grave disease, and the prognosis is decidedly unfavorable, principally due to the impoverished condition of the blood, and general sepsis.

Treatment.—The local treatment will consist of first cleansing the mouth thoroughly, trimming away the gangrenous sloughs and washing the ulcer with a five per cent solution of pyrozone, or a solution of potassium permanganate. The orifice should then be packed with cotton saturated in echinacea.

Internally, give echinacea three drams, water four ounces; teaspoonful one hour, alternating with a saturated solution of hydrastin or potassium chlorate. Where the tongue is covered with a *nasty, dirty, pasty* coating, sodium sulphite will be used. The mineral acids will replace the above remedies if the tongue be dry and brown and sordes appear on the teeth. The treatment will be antiseptic throughout.

GLOSSITIS.

Definition.—An inflammation of the parenchyma of the tongue, usually terminating in resolution, though suppuration occasionally results.

Etiology.—This may occur as the sequel of pneumonia, or as a complication, though the exciting cause is most frequently the result of bites or stings from insects, or scalds from hot fluids, or from corrosives. Anders suggests that injuries to the tongue provide an entrance for various bacilli, which may be an exciting cause.

Symptoms.—These depend somewhat upon the form, whether a primary or a secondary lesion. In the one case, swelling of the tongue begins rapidly, soon filling the mouth, and even protruding from the lips.

The tongue may be coated, though usually it is dry, red, and glossy. There is tenderness and pain and great difficulty in

swallowing. The dyspnea is distressing and sometimes endangers life. The patient is unable to talk and distress is evident in every feature. There is an increased flow of saliva, with swelling of the submaxillary glands. The pulse is rapid, and the temperature ranges from 102° to 104° . It usually runs its course in from five to seven days. Where the disease is secondary the symptoms are developed more slowly, though similar to the ones just described.

Diagnosis.—The swollen, stiff, and immobile tongue renders the diagnosis easy.

Prognosis.—It is favorable in the acute form, but must be guarded, if a complication of a grave disease.

Treatment.—Where the tongue is badly swollen and tense, I have found soft linen cloths dipped in a solution of glycerin and potassium chlorate and hydrastis, and applied to the tongue, to give the greatest relief. Alkaline washes may also be used. Internally, aconite and phytolacca are useful; bits of cracked ice may be held in the mouth, and is grateful to the patient.

I would discourage scarifying the tongue, as the relief is but momentary and the pain quite severe. Inhalations of steam from hops and tansy or eucalyptus will also give relief. If the dysphagia is great, feeding by rectum may be necessary. Where the disease is secondary, in addition to the means above mentioned, appropriate remedies should be used for the primary lesion.

II. DISEASES OF THE SALIVARY GLANDS.

HYPERSECRETION.

Synonym.—Ptyalism.

Definition.—An excessive secretion of saliva.

Etiology.—The disease may occur in a number of affections; thus it is occasionally seen in nervous, emotional children, and also in hysteria, here being due to a neurosis. It is sometimes present in the acute infectious fevers, notably small-pox. It is quite common in several forms of stomatitis, as has already been noted. Pregnancy is occasionally accompanied by an annoying

flow of saliva. Certain vegetable agents cause an excessive secretion, jaborandi, muscarin, and tobacco being the most common examples, though their action is soon over.

The most frequent cause, and by far the most serious, is from the ingestion of mercury, it sometimes lasting for weeks after a patient has been thoroughly mercurialized.

Symptoms.—The mouth is constantly bathed with saliva, which necessitates frequent spitting on the part of the patient, or, in children, an almost constant dribbling. Where it is very excessive, talking is carried on with difficulty. The almost constant wetting of the lips may be attended by chapping and cracking at the angles of the mouth.

Diagnosis.—The continued dribble, or frequent emptying of the mouth of saliva, is confirmatory of the lesion.

Prognosis.—The prognosis is favorable, though in pregnancy it may continue to full term, and, in the worst cases of mercurialization, may persist for weeks.

Treatment.—This will depend somewhat upon the cause. In the case of stomatitis, the treatment recommended for the local disease is sufficient for a cure. If it be due to pregnancy, iris versicolor will sometimes afford relief. Where it results from mercury, potassium chlorate, both as a wash and internally, will give good results. Belladonna, especially where there is general capillary congestion, is very efficient. Atropia in 1-100 grain doses once or twice a day is useful in some very persistent cases. Small doses of jaborandi, will be found beneficial.

XEROSTOMIA.

Synonym.—Dry Mouth.

Definition.—A defect or arrest of the salivary and buccal secretions.

Etiology.—In some cases it is undoubtedly a neurosis, the large majority of cases occurring in females. In many cases the cause is unknown. Diabetes is frequently attended by great thirst and dryness of the mouth, and should be considered as a causal factor.

Symptoms.—The mouth is dry, red, or parched, resulting in difficulty in mastication, deglutition, and talking. Digestion is more or less impaired, and gastric symptoms may be present.

SPECIFIC PAROTITIS-MUMPS-SYMPTOMATIC PAROTITIS. 501

Diagnosis.—The patient calls our attention to the unpleasant condition of dryness, and inspection reveals the condition.

Prognosis.—This depends upon our ability to remove the cause.

Treatment.—Jaborandi given in large doses has been found beneficial. Galvanism promises more, perhaps, than drugs. In one very persistent case, that of an old gentleman, I recommended him to chew Yucatan gum, and this was followed by greater relief than that afforded by medicine.

INFLAMMATION OF THE SALIVARY GLANDS.

SPECIFIC PAROTITIS.—MUMPS.—SYMPTOMATIC PAROTITIS.

Synonym.—Parotid Bubo.

Definition.—As the name suggests, this is a secondary inflammation of the parotid gland, with greater tendency to supuration than in specific parotitis or mumps.

Etiology.—This being symptomatic, there are a variety of causal factors that figure in the production of the disease. Thus it may come up during the infectious fevers, especially in typhoid and dysentery. In these cases the septic condition of the blood may be, and usually is, the cause; or the inflammation may extend along the salivary duct till it reaches the gland. In peripheral neuritis following facial paralysis, symptomatic parotitis may occur.

Paget has called attention to injuries or disease of the abdominal and pelvic viscera; such as an injury to the abdominal wall, or to the peritoneum, or the urinary tract. A blow on the testes has also been followed by parotitis, as has the introduction of a pessary, some menstrual derangements, and pregnancy.

Symptoms.—During the course of the primary disease, or following an injury, the gland becomes swollen, tender, and more or less dusky and livid. There is a marked tendency to supuration.

Diagnosis.—The swollen and enlarged gland makes the diagnosis easy.

Prognosis.—A certain per cent will terminate in suppuration.

Treatment.—The cause being septic conditions of the blood, the treatment will very naturally be the administration of antiseptics; hence, echinacea, in five to ten drop doses, will fit many cases. Combine with this agent phytolacca. In place of these, sodium sulphite, if the tongue be covered with a nasty, dirty, pasty coating. If dry and brown, muriatic acid replaces the soda. If we see that suppuration can not be prevented, moist, hot applications should be made, hastening the process, when it should be freely opened and treated aseptically as any other abscess.

III. DISEASES OF THE PHARYNX.

ANGINA SIMPLEX.

Synonyms.—Sore Throat; Acute Pharyngitis.

Definition.—An acute inflammation of the mucous membrane of the pharynx, and sometimes of the entire pharyngeal structure.

Etiology.—While the exciting cause is most frequently sudden atmospheric changes inducing colds, it may follow certain infectious fevers, notably scarlet fever and la grippe. Not infrequently there seems to be a rheumatic or gouty taint, which renders the patient very susceptible. It occasionally appears in epidemic form, when it is undoubtedly due to infection. Acrid secretions from nasal catarrh may prove sufficient in some cases to give rise to pharyngitis.

Symptoms.—The symptoms of sore throat are characteristic, the patient complaining of pain and fullness in the throat, especially when swallowing. The surfaces are dry and swollen, and the patient swallows frequently to give relief. On inspection, we see a vivid redness of the mucous surfaces, and where the submucous tissues are involved, the throat presents a dusky hue. The inflammation, quite often, invades the posterior pillars of the fauces, the tonsils, and, sometimes, even the larynx.

The patient hawks or coughs frequently to relieve the sense of constriction in the early stage, and to remove the secretion, which constantly bathes the surfaces, in the latter stages. The lymph glands are swollen, and frequently the neck becomes quite

stiff. With the ushering in of the disease, there may be chilly sensations, followed by slight fever, dry skin, constipation, and general arrest of the secretions. If the larynx be involved, there may be a sense of constriction of the throat, hoarse voice, and frequent cough.

Diagnosis.—Inspection reveals the character of the disease, and it can scarcely be mistaken for any other trouble.

Prognosis.—The disease readily yields to specific treatment, though in delicate children it is apt to leave the throat susceptible to a repetition on slight exposure.

Treatment.—Aconite has a special affinity for lesions of the throat, and we find it one of our best agents, and useful in nearly every case. To this may be added phytolacca, where there is swelling of the lymphatics; belladonna, where there is a vivid redness; guaiac, where the tonsil is involved. If the tissues are dusky, baptisia will answer a better purpose.

Where there is sepsis and the tissues livid, echinacea will give better results. If the tongue is coated with a yellowish moist coating, and there is offensive breath, potassium chlorate and hydrastis are the remedies, while sodium sulphite replaces these agents when the tongue is broad and heavily coated with a dirty, moist, pasty coating. When the tissues are dark red, and the tongue is red and dry, muriate tincture of iron is a specific.

Where the larynx is involved and the voice is hoarse, drop-doses of stillingia liniment internally, and applied over the larynx, will give prompt relief, or hamamelis and collinsonia are good remedies for laryngeal complications.

The local treatment will vary in different conditions. If the inflammation is active, wring a small towel out of cold water, and apply snugly around the throat, being careful to have a dry binder over this. As a gargle I know nothing superior to potassium chlorate and hydrastis; use every one or two hours. If the deeper tissues are involved and the throat presents a relaxed appearance, gargle with hamamelis or perchlorid of iron. Of the latter use one dram to glycerin and water of each two ounces. Where the patient can not gargle, potassium chlorate may be triturated with gum arabic and sugar, and about as much as will lie upon a dime placed upon the tongue and slowly allowed to dissolve, repeating every two or three hours.

Upon recovery, the patient should be directed to flush the throat and chest every morning with cold water, to be followed by brisk rubbing till the parts are thoroughly dry. If this be persisted in for several months, the patient outgrows the susceptible condition.

PHLEGMONOUS PHARYNGITIS.

Synonym.—Cynanche Maligna.

Definition.—A low grade of inflammation, involving the deeper tissues of the throat, attended by sepsis and ulceration.

Etiology.—The cause is not known, though all the symptoms point to poisoning of the blood, and no doubt it bears a close relation to the infectious material of kindred diseases. Depravation of the blood from any source, as well as poverty, with its attendant surroundings, predisposes to this lesion.

Symptoms.—Dr. Scudder gives such a plain, typical, and vivid picture of the symptoms that I will reproduce it here:

“For two or three days, sometimes for a week, it is noticed that the patient looks pallid, his skin waxy or pasty, and that there is a want of expression in the countenance. The breath is also bad, the tongue broad and pale and somewhat loaded.

“In some cases the disease is fully announced by a chill of longer or shorter duration. But in others there is such a gradual increase in the symptoms that it is difficult to separate the forming stage from the fully developed disease.

“When the physician is called, he finds evidences of a general and a severe local disease. The pulse is soft, easily compressed, and increased in frequency from ten to thirty beats per minute. The extremities are kept warm with difficulty, the skin is pallid or sallow, and presents a peculiar waxy appearance, looking many times as if it were edematous, and would pit on pressure. The face is pallid and expressionless, with a dark line under the eyes, which also are dull, with dilated pupils. The bowels are irregular, the feces clay-colored and papescent; the urine free, pale, and of low specific gravity. There is no appetite; indeed, from the condition of the mouth and throat, there is disgust for food.

“On examining the mouth and throat, we find the mucous membranes pallid, the tongue broad, pitting where it comes in

contact with the teeth, and covered with a pasty, white coat. The mucous membrane of the throat is swollen and discolored; in some cases it is livid, in others of a dusky red, and in some few it presents a peculiar blanched appearance. The tissue seems relaxed and flaccid, and the circulation sluggish.

"In a couple of days small points of ulceration will be seen, sometimes superficial, at others with a tendency to extend in depth. These ulcers increase in size more or less rapidly, according to the severity of the disease, and the throat will present a markedly ragged and foul appearance. In very severe cases the ulcers pass through the mucous membrane and invade the cellular tissue, so that in fatal cases the structures are destroyed to a greater extent than we would deem compatible with life, for some hours before death ensues.

"A distinctive symptom of malignant sore throat is the change in the tone of the voice; it is not so much hoarse as hollow and sepulchral; as a musician would say, 'It has lost its timbre.'

Diagnosis.—"This disease is readily recognized by the fetid breath, the abundant secretion from the throat and mouth, and by the peculiar relaxed condition of the structures. Add to this the general cachexia, which is peculiar to this and, to some extent, to cancrum oris, and we have a grouping of symptoms that can not be mistaken.

Prognosis.—"Though the disease is a very unpleasant one, and attended with much depravation of the fluids and solids, the prognosis is not unfavorable. A large majority of cases will recover, probably as much as ninety or ninety-five per cent.

Treatment.—"The treatment of *cynanche maligna* will be both constitutional and local. We want to antagonize the septic influence, improve the circulation of the blood, increase the tone of the system, and place the stomach in condition to receive and appropriate food, and re-establish secretion.

"Aconite and belladonna may be given in small doses, to improve the circulation. Under their influence we find the pulse becoming stronger and more full, the capillary circulation better, and the temperature of the body more uniform.

"Of the antiseptics I prefer sodium sulphite in the majority of cases, giving it, in the usual doses, every three hours. In some cases potassium chlorate may be used instead, or alternated

with the sulphite; triturated with gum arabic and sugar, as named for diphtheria, will probably be the best form for administration. The baptisia in infusion is an excellent antiseptic, and may be associated with either of them."

Echinacea, in full doses, will be among our best agents.

"In addition to this, I prescribe quinine in stimulant doses, sometimes alone, at others in combination with hydrastin. The dose will be about two grains, three or four times a day. Tincture of muriate of iron can also be used with advantage in some cases. It may be especially named as an important remedy in those cases which manifest an erysipelatous tendency.

"The local means will vary in different cases. In the milder ones a decoction of baptisia, used as a gargle, will be sufficient. In others we may alternate this with a gargle of potassium chlorate, and in others the sodium sulphite will answer a good purpose. In those cases where the tissues are relaxed and the ulceration progresses rapidly, potassium permanganate will be the most powerful, as well as the most certain local remedy we can use. We would make the solution of the strength of one dram of the salt to one pint of water. When it is used with the pencil or probang, it may be applied much stronger than this.

"We find some patients who can not use a gargle to advantage, and in some of the severe cases the throat is so paralyzed as to prevent its use; in these cases we will have to employ other plans for local applications. I do not like the use of the probang to make local applications to the throat. Instead of this I use inhalation, preferring the spray apparatus, either air or steam, to any other apparatus. But it does not require an instrument; for, as we have already shown, an inhalation can be given with nothing but a vessel to hold the fluid and a heated iron to raise a vapor. The vapor of vinegar and water answers an excellent purpose, as does an infusion of tansy, or of baptisia. In using the spray apparatus we may use the same remedies named for gargles. A solution of carbolic acid, grains five to grains ten to water four ounces has been highly recommended. I have also used the sulphurous acid alone, or diluted with water, with excellent results."

A five per cent solution of pyrozone is especially useful in those cases where the ulcers are foul.

"The external application in this, as in many other diseases of

the throat, is a flannel wrung out of cold vinegar, with a dry flannel over it. We call it the vinegar pack, but a cold-water pack to the throat will answer the purpose."

CHRONIC PHARYNGITIS.

Synonyms.—Chronic Follicular Pharyngitis; Chronic Granular Pharyngitis; Pharyngeal Catarrh.

Definition.—A chronic inflammation of the mucous surfaces of the pharynx and adjacent tissues.

Etiology.—It may be the result of repeated attacks of the acute form, or it may come on gradually, the result of continued irritation from smoking or drinking. Very hot drinks or highly spiced food may also render one liable to this affection. Frequent hawking to clear the posterior nares is a very frequent source of irritation. Another common cause is the frequent and injudicious use of the voice as noted by street fakirs, campaign orators, and those who strain the voice, especially in the open air. Acrid eructation from a disordered stomach may also figure in producing the disease.

Pathology.—The mucous membrane of the pharynx and fauces is relaxed and somewhat thickened and of a vivid red or dusky color. The venules are dilated and tortuous and the mucous surface is studded with small, round, red bodies, the enlarged mucous follicles. The hypertrophied membrane, when relaxed and flabby, appears as if laid in ridges. In some cases there is atrophy of the mucous follicles, and the surface is dry, red, and glistening,—pharyngitis sicca.

Symptoms.—The patient experiences a sense of stuffing up in the upper part of the throat, and, to get relief, there is frequent effort to remove it by hawking, or, where the surface is dry, there is almost constant swallowing. A short, dry, hacking cough reveals laryngeal complications, and the voice is more or less husky. Inspection reveals a varied condition; in the earlier stages the mucous membrane is swollen, red, and bathed in mucus; later we find it dusky in color, and studded with the enlarged mucous follicles. Again, the surface is red, glistening, and dry, or red and covered with tenacious mucus, which is removed with difficulty.

The uvula may be full and relaxed. There is usually no pain, though an uncomfortable sensation exists most of the time, owing to the dryness of the throat in the one case, and the viscid secretion in the other.

Diagnosis.—Inspection and history of case reveal the disease.

FIGURE 25. CHRONIC FOLLICULAR PHARYNGITIS.—(Folts.)

Prognosis.—This is favorable, save where there are marked structural changes.

Treatment.—In beginning the treatment, the patient must clearly understand that all sources of irritation are to be avoided if a cure is effected. Smoking, the use of alcoholic drinks, highly seasoned food, the prolonged use of the voice, especially in the open air, are to be discontinued.

The local treatment will consist of galvanism, gargles, and the use of the spray; the remedies, depending upon the condition of the tissues. Where the tissues are relaxed and a stimulant is required, capsicum, ℥ii; tannic acid, ℥ss; water, O.i, will act kindly. If a sedative is needed the prescription will be:

℞	Hydrastis	℥ss.	
	Potassium Chlorate.....	℥ii.	
	Water	℥viii.	M.

Hamamelis often gives good results. When the throat is bathed with mucus or muco-pus, galvanism is the best local treatment. Where there are enlarged follicles, the galvano-cautery is the most successful method of effecting a cure. Boracic acid is a favorite remedy with many.

Internally, collinsonia has afforded relief in many cases, especially where the larynx is involved. Sanguinaria, third tritura-

tion, every three or four hours, will relieve the tickling sensation so often experienced; belladonna where the throat is bright red, swollen, and dry; or we may use jaborandi with these same conditions.

Guaiac will also be frequently used for similar conditions. Attention must be paid to the general health; for local disorders fail to yield to local treatment where there are systemic wrongs. An impoverished blood must be corrected, gastric derangements overcome, and the secretions established.

ULCERATION OF THE PHARYNX.

Synonym.—Ulcerated Sore Throat.

Definition.—An indolent ulceration of the mucous membrane and deeper tissues of the pharynx.

Etiology.—This form of ulcerated sore throat occurs most frequently in persons of depraved constitutions, who are exposed to septic influences. It is secondary in syphilis and tuberculosis, both of which have been described under their respective diseases.

Follicular ulceration of the pharynx, as the name suggests, is a superficial ulceration of the follicles on the posterior walls of the pharynx, and appears as small, raised, yellowish sores.

Symptoms.—There is usually slight fever, loss of appetite, a coated tongue, bad breath, and painful deglutition. On inspection, we see small ulcerated patches on an inflamed base; quite often the neighboring tissue, the tonsils, are involved. The secretions are more or less arrested and the patient may feel quite sick, with great prostration, more so than the throat symptoms would warrant. This is nearly always associated with catarrhal pharyngitis.

Diagnosis.—There is scarcely any difficulty in recognizing the disease. The small, elevated, superficial ulcer tells the story.

Prognosis.—This is always favorable.

Treatment.—The treatment is specific, and the cure completed in a few days:

℞	Aconite	gtt. v.	
	Phytolacca	gtt. xv.	
	Water	℥iv.	M.
	Sig. Teaspoonful every hour, with a gargle of potassium chlorate and hydrastin		

Where there is smarting and burning in the throat.

R Rhus Tox.....gtt. x.
 Water℥iv. M.
 Sig. Teaspoonful every hour.

A spray of a five per cent solution of pyrozone is very good in many of these cases.

IV. DISEASES OF THE TONSILS.

ACUTE CATARRHAL TONSILLITIS.

Definition.—An acute inflammation of the mucous membrane covering the tonsils.

Etiology.—This form of tonsillitis is the result of exposure to cold, and occurs most frequently with the breaking up of winter, when sudden atmospheric changes are common. Bad hygienic conditions also favor the disease.

Symptoms.—The disease is ushered in by slight constitutional symptoms, such as chilly sensations followed by slight fever, with general arrest of the secretions. The patient complains of sore throat, and inspection reveals an active hyperemia of the mucous membrane, with slight swelling of the gland. At first the surface is dry and painful, the patient swallowing frequently, to moisten the surface. In a short time secretion is established, and the surface is bathed with a creamy muco-pus. Where the inflammation is active there is slight swelling of the lymphatics.

Diagnosis.—The location of the pain, the bright red, inflamed mucous membrane covering the tonsils, which are slightly enlarged, is characteristic.

Prognosis.—The prognosis is always favorable, the disease yielding in four or five days.

Treatment.—Aconite and balladonna usually are the only remedies needed; five drops of the former and ten of the latter, added to water four ounces, a teaspoonful every hour, soon terminates the disease; or aconite and phytolacca, when there is enlargement of the lymphatics. Dr. Watkins regards guaiac as a specific in these cases, associated with aconite. As a local treatment, have the patient use a gargle of potassium chlorate and

hydrastin. A cloth wrung out of cold water and snugly applied around the throat, with a dry binder over all, is very effective when the inflammation is active.

FOLLICULAR TONSILLITIS.

Synonym.—Lacunar Tonsillitis.

Definition.—An inflammation of the mucous membrane covering the tonsils and lining the crypts or follicles of the gland.

Etiology.—This occurs most frequently between the ages of ten and twenty-five, while it is rare in infants and after middle life. Exposure to wet and cold, especially after overheating or undue use of the voice, is a common exciting cause. It occurs most frequently in the spring. Bad hygienic surroundings, especially where the sewerage is defective, allowing the escape of sewer-gas, is also thought to be a fruitful cause. An effort has been made, with some success, to show that there is some relation existing between rheumatism and this disease.

Measles, scarlet fever, and diphtheria, of the infectious fevers, play some part as a causal factor in this lesion.

Pathology.—The lacunæ are filled with a cheesy substance, consisting of epithelial cells and various micrococci, and, protruding from the crypts, give the tonsil a spotted appearance; the mucous membrane between the crypts is bright red, and bathed with a creamy pus, sometimes resembling a membrane, and may be mistaken for diphtheria, though the ease with which it may be wiped off should allay all doubts as to its character. Sometimes calcareous degeneration occurs, and limy or chalky deposits fill the lacunæ.

Symptoms.—This is more severe than the catarrhal form, and is usually ushered in with a chill, followed by rather a high grade of fever considering the local character of the disease. During the initiatory stage the patient complains of aching all over the body, and one who is subject to the disease will diagnose his own case before there is much local trouble.

The throat soon becomes sore and stiff, the pain extending to the ear; the tonsil or tonsils are red, angry-looking, with yellowish spots, the cheesy exudate showing from the crypt. Swallowing is difficult, and respiration is more or less impaired; the

lymphatics are generally involved. The tongue is coated with a dirty fur, the breath is offensive, and the secretions markedly arrested, the skin being dry, urine scanty, and bowels constipated; the temperature frequently reaches 103° or 104° . The disease reaches its height by the fourth or fifth day, then gradually declines, the patient being convalescent by the end of the second week.

Diagnosis.—Remembering the chief characteristics of this form of the disease, the diagnosis is readily made; the active fever, the characteristic aching of the whole body, the cheesy exudate filling the lacunæ, and the creamy exudate that can be readily wiped off without causing bleeding, enables us to recognize this from diphtheria, the only disease that it resembles.

FIGURE 26. FOLLICULAR TONSILLITIS.—(Foltz.)

The clinical picture is a surer guide than the Klebs-Loeffler bacillus, as it is well known that this germ may reside in other than diphtheretic throats.

Prognosis.—The prognosis is favorable, the disease rapidly yielding to specific treatment in from three to five days.

Treatment.—But few remedies are needed; aconite, phytolacca, belladonna, macrotys, gelsemium, and guaiac will meet all the conditions present.

Where the surface presents an angry appearance, and is red, dry, and hot,—

℞	Aconite	gtt. v.	
	Belladonna.....	gtt. viii to x.	
	Water	℥iv.	M.
	Sig. Teaspoonful every hour will give relief.		

Where the throat is painful and the lymphatics are enlarged, nothing is better than aconite and phytolacca, a half a dram of the latter replacing the belladonna in the former prescription. My colleague, Dr. Watkins, could hardly treat this disease without using tincture guaiac, and, having used it recently, I am ready to give it a hearty sanction. For the general aching and soreness and stiffness of the neck, gelsemium and macrotys a half dram, to four ounces of water, will give speedy relief. The use of potassium chlorate as a gargle, and the cold wet pack, will be the only local treatment necessary.

ACUTE SUPPURATIVE TONSILLITIS.

Synonyms.—Quinsy; Angina Tonsillaris.

Definition.—An inflammation of the parenchyma of the tonsil, with tendency to abscess formation.

Etiology.—The predisposing causes are such as have been mentioned for follicular tonsillitis. Tuberculosis may be added as influencing unfavorably the tonsillar structures. We might say truly that any disease which lowers vitality and impoverishes the blood renders the glands more susceptible to disease. Bad hygienic surroundings and exposure to cold are the exciting causes. A previous attack and hypertrophy of the glands also render them more susceptible. Age also influences the disease, it being rarely seen in persons under fifteen years of age, or in those past middle life.

Pathology.—The tonsils become red, swollen, and sometimes enormously distended, occluding the throat when both tonsils are affected at the same time. The inflammation often extends to the pharyngeal tissues, and the uvula becomes relaxed and edematous, resembling a small bladder. The connective tissue surrounding the gland becomes greatly enlarged, followed by supuration.

Symptoms.—The initial symptoms are so characteristic that the patient, if he has had several previous attacks, is able to diagnose the case even before the local symptoms are very marked. The chilly sensations accompanied by headache, backache, general aching of the whole body, flushed, hot face, and dryness of throat,

tell him of an attack of tonsillitis as plainly as though he had consulted a physician.

The throat becomes sore and stiff, and there is a sensation as though some foreign body were in the throat, which causes the patient frequent swallowing in hopes of relief. As the inflammation progresses, the gland becomes very much swollen, and if both sides are affected at the same time, the throat is almost occluded, rendering respiration difficult, deglutition very painful and almost impossible.

The parts are bathed with aropy mucus, which gives rise to a guttural cough in its removal. The tongue is coated with a dirty, offensive fur, the skin is dry and constricted, the urine scanty and highly colored, and the bowels constipated. The temperature is quite high, 103° , 104° , or 105° . Within forty-eight or seventy-two hours, the glands are enormously enlarged, the adjoining tissues share in the inflammation, and inspection reveals tonsils, kissing across the chasm, and the edematous uvula, like a small bladder, resting upon the surface.

The submaxillary glands become enlarged, and the opening of the mouth is attended with great pain, and is sometimes impossible owing to locking of the jaws. A throbbing pain, together with chilly sensations, announces the suppurative stage. Dyspnea is now a marked feature; the patient is unable to lie down, and his distress is painful to look upon. At this juncture, when he fears he will choke to death, the tonsils rupture spontaneously, followed by immediate relief.

Quite often the patient, weary and worn with suffering, drops asleep, to be aroused by a strangling sensation, to find his mouth full of pus and blood. With the rupture of the abscess, the gland soon returns to its normal condition, and the disease terminates in a week or ten days. The suppurative process may extend to the cellular tissues between the tonsils and the pterygoid muscles, giving rise to a peritonsillar abscess, which may point above the clavicle.

Diagnosis.—The disease is readily recognized upon inspection; the swollen gland, the guttural voice, the immobile jaws, can not be mistaken for any other affection.

Prognosis.—This is almost always favorable, the principal danger being from entrance of pus into the larynx during a spontaneous rupture, while the patient is asleep.

Treatment.—If seen early, under specific medication, nearly every case can be terminated by resolution.

℞ Aconitegtt. v.
 Belladonnagtt. x.
 Water℥iv. M.

Sig. Teaspoonful every hour or half-hour, will terminate a majority of cases in from forty-eight to seventy-two hours.

℞ Guaiac.....℥ss to ℥i.
 Water℥iv. M.

Sig. Teaspoonful every hour.

This is also quite a successful treatment.

Where there is swelling of the lymphatics, and the throat presents a spotted appearance, follicular complication, phytolacca will replace the belladonna. Locally, we may spray the throat with aconite one dram, to water four ounces, requesting the patient to empty the mouth and throat of the aconite. This, of course, is to be used only with adult patients. Painting the tonsils with veratrum has also been highly recommended. A gargle of potassium chlorate and hydrastin will be found useful.

Externally the cold pack and dry binder must be used where the fever is active. After escape of pus, the throat may be cleansed with listerine, pyrozone, or the above-mentioned gargle.

CHRONIC TONSILLITIS.

Synonyms.—Hypertrophy of the Tonsils; Mouth-Breathing.

Definition.—An enlargement of the glands due to repeated inflammations of the tonsils, and occurring usually in early life.

Etiology.—While chronic inflammation of the tonsils may come on insidiously, it more often is the result of frequent attacks of follicular tonsillitis.

Among predisposing causes we may mention heredity, there being a tendency for the children of parents with enlarged glands to the same disease.

Age.—The disease being most frequently found in children between the ages of five and ten years.

The Infectious Diseases, such as tuberculosis, syphilis, and especially those in which the throat is apt to suffer; such as diphtheria, scarlet fever, la grippe, and sometimes measles.

The presence of adenoids frequently precedes tonsillitis, and may be given as a predisposing cause.

Pathology.—All of the tissues of the tonsils are involved, but in varying degree. In some the lymphoid changes predominate, while in others the stroma seems more involved, and a firm, fibrous tissue is developed. In the former the gland is larger, softer, and the follicles increase in depth, while their mouths dilate, their openings revealing white or yellowish-white plugs of cheesy particles, the debris of broken down epithelial cells or calcareous or chalky deposits; at times the contents consist of food. Where the fibrous change predominates, the tonsil becomes firm, hard, blanched, and somewhat atrophied.

Symptoms.—At first the symptoms are not pronounced, and a child may have enlarged tonsils for some time without the parents knowing of the condition; the frequent sore throat following a cold finally leads to an examination of the throat, when the hypertrophy is discovered. Usually, however, the first symptom that calls attention to the throat is the difficult breathing, especially at night, when it is observed that the child breathes with the mouth open—mouth-breathing. The child snores, chokes, and starts from sleep in a fit of dyspnea quite alarming to the parents, though it is never serious.

Inspection reveals two dusky or blanched, enlarged tonsils, covered with a profuse secretion of mucus, which necessitates a frequent hawking to clear the throat. Often white or yellowish-white cheesy deposits are seen filling the crypts. These are occasionally hawked up in the form of small, fetid, cheesy lumps, or sometimes a calcareous plug is spit up. Such material as epithelial debris, micro-organisms, and soft particles of food, give rise to a peculiarly offensive breath.

The roof of the mouth, the hard palate, is highly arched. The pressure of the enlarged tonsil on the Eustachian tube, or an extension of the inflammation along the tube, together with the pressure of the mucus from the pharynx, impedes the hearing, and sometimes renders the child quite deaf. The child contracts cold readily, when the tonsils become angry-looking, and an acute attack follows.

From the mouth-breathing the child takes on a dull, stupid, and besotted expression; the lips are thick and the eyes dull. The

child is listless, apathetic, and responds slowly in speech and thought. The obstructed breathing may cause deformity of the chest, known as chicken or pigeon breast, where the sternum is prominent, with a more marked separation of the ribs anteriorly and converging posteriorly. Where the breathing is labored and asthmatic, the chest becomes barrel-shaped.

Chronic tonsillitis renders all sore throats more serious, such as scarlatina, diphtheria, pharyngitis, etc.

The general health suffers more or less. Indigestion from excess of mucus is often found, while anemia is not uncommon. Headaches are frequent, while inability to concentrate the mind renders the child backward in mental development.

Diagnosis.—Inspection reveals the character of the disease, and it can hardly be mistaken for any other trouble, unless it be that of malignant growths; and even here the mistake should not occur often. In malignant growths, it is usually confined to one side, is attended by severe pain, and presents a more angry appearance.

Prognosis.—This depends upon the character of the enlargement and the length of time involved. If the lymphoid changes predominate, the hope of recovery is far better than when the fibrous tissue prevails. These tissue changes render respiratory diseases, as well as throat troubles, more severe; hence they influence our prognosis. So far as life is concerned, the prognosis is always favorable.

Treatment.—Upon the character of tissue change largely depends the treatment. If the lymphoid predominates, and the tonsil is soft, we may expect good results from injections of thuja, or from the old application of perchlorid of iron and glycerin, equal parts. With a large camel's-hair brush, paint the tonsils twice per day. As the tonsil becomes accustomed to the iron, increase the strength of it till it is used full strength. The galvanocautery will, however, give better results than local application.

If the bulging tumor is pale, hard, and fibrous, the most satisfactory treatment is amputation of the glands. When the general health suffers, attention must be directed to correcting the various wrongs that may be present. Good hygienic conditions are necessary, and the flushing of the neck each morning in cold water will overcome a tendency to contract colds.

V. DISEASES OF THE ESOPHAGUS.

ESOPHAGITIS.

Definition.—An acute inflammation of the mucous membrane of the esophagus, frequently involving the submucous tissues.

Etiology.—Inflammation of the esophagus is quite rare, and may arise from swallowing very hot drinks or hot food, or from a hard substance, as a spiculum of bone. A frequent cause is strong alkalis or acids, taken either by mistake or with suicidal intent. Carbolic acid and concentrated lye are most frequently taken. It may also be an extension of an acute pharyngitis or acute gastritis. It may be due to the infectious fevers, such as typhoid, typhus, pneumonia, or diphtheria, the latter showing its character by a membranous exudate. In confluent small-pox, ulceration of the esophagus, with its attendant inflammation, may result. Malignant growths are not uncommon.

Pathology.—The pathological changes are similar to those of inflammations of other tubes, though there may not be such a pronounced redness of the mucous membrane. The epithelium is usually thickened, and, when denuded, leaves a granular appearance. The mucous follicles become swollen, frequently followed by small follicular ulcers. In some cases there is a croupous exudate in the upper portion of the tube.

In some of the severe confluent cases of small-pox, pustules will be found in the esophagus, though this is exceedingly rare. When the submucous tissues are involved, suppuration may occur, the pus being discharged within the tissue. In the more chronic forms there is thickening of the mucous tissues in some parts, with atrophy of others, which gives a sacculated appearance to the tube. If the inflammation has been caused by a corrosive poison, stricture is very apt to follow.

Symptoms.—A dull, uneasy feeling, or sometimes a burning, smarting sensation, is experienced in the esophagus posterior to the sternum. Swallowing is difficult, and aggravates the pain. The presence of food, even though bland, often produces vomiting of blood, mucus, or pus. Where ulceration occurs, stricture is apt to take place, necessitating the use of fluid nourishment altogether. Where there is a croupous exudate, we have the his-

tory of diphtheria with its attendant symptoms. In the latter case, there is not only dysphagia, but difficult respiration as well.

Diagnosis.—The location of the pain, the difficulty of swallowing, attended by a burning sensation, are characteristic of this disease, and if an esophageal sound is used, tenderness and pain are elicited, and the sound is streaked with a bloody mucus. This latter condition is found in carcinoma, though in the latter case there would be greater systemic disturbance, and the peculiar cancerous cachexia would be noticed, also the more persistent character of the pain.

Prognosis.—The prognosis is favorable in the milder forms, but must be guarded where strong corrosives have been taken; for if life be preserved, stricture is apt to follow. Where there is the croupous exudate the amount of the systemic disturbance will have to be taken into consideration.

Treatment.—The treatment for this disease will not differ materially from that for any other part. Only the blandest form of diet should be used. Milk in some form, either as whey or malted milk, is preferable. In some cases small bits of ice are gratefully received. In the way of medication, we think of aconite, rhus tox., hamamelis, and agents of like character where there is no sepsis, but if the suppurative process has been established and there is evidence of sepsis, echinacea, baptisia, sodium sulphite, hydrochloric acid, and potassium chlorate will be the remedies indicated.

STENOSIS OF THE ESOPHAGUS.

Synonym.—Esophageal Stricture.

Definition.—A diminution of the caliber of the esophagus by cicatricial contraction, thickening of its walls, or by pressure from growths.

Etiology.—The most common cause is due to an injury of the mucous membrane by corrosive fluids, resulting in cicatricial contraction. A chronic inflammation of the tissues of the tube may result in thickening of the same, thus lessening its caliber. Cancerous infiltration in the walls of the esophagus is not an uncommon cause. More rarely contraction from tubercular, syphilitic, or variolous ulcerations take place. Pressure from without

by growths, either malignant or benign, is an occasional cause. A wound of the esophagus may also cause stenosis by contraction during the repair of the injury.

Pathology.—The stricture may involve any portion of the tube, and may be very slight, or so severe that fluids pass with difficulty. It may be confined to a part, or involve the entire organ. If the lower third be affected there will be dilatation of the upper portion, with hypertrophy of the walls.

Symptoms.—These depend largely upon the degree of obstruction, the location of the stricture, and the causes producing it. Difficulty in swallowing, more or less, is a distressing feature in all cases; though, at first, but slight, and when some substance larger than usual is swallowed. A sense of constriction and a dull, tensive pain are experienced. As the stenosis increases, the dysphagia becomes more marked. If the stricture be located in the lower part, more or less food accumulates in the dilated upper portion, to be ejected three or four hours later. This is alkaline in reaction and contains mucus and sometimes pus and blood. If there be ulceration, pain is experienced on taking food. The general health suffers in proportion to the degree of the stricture and impairment of the nutrient material. If the stricture be due to cancer, the continued dull pain, with occasional darting pains, the distressing dysphagia on taking food or drink, the presence of blood in the ejected food, and, above all, the gradual emaciation, the yellow, waxy, sodden cachexia, will be characteristic.

Diagnosis.—This is readily made by the symptoms already described, though, to be positive, the esophageal sound should be used, when we readily determine the location and degree of the stricture.

Prognosis.—It is unfavorable in the large majority of cases. Where there is but little structural change, repeated dilatation will effect a cure.

Treatment.—It is very doubtful if medicines produce any influence on this unfortunate condition. The treatment, therefore, will be entirely mechanical. The frequent and careful dilatation, with graduated sounds, will effect a cure where the stricture is confined to the mucous or submucous tissues. Where there is cancerous infiltration, the sound should be avoided as it only sets

up irritation, causes pain, and generally aggravates the disease. Galvanism, in the hands of one thoroughly capable of using it, promises much, though the uninstructed had better not attempt its use. Spasmodic stricture occurs in females between the ages of eighteen and thirty, and who are hysterically inclined. The treatment in such cases will be symptomatic, anti-spasmodics being most frequently indicated. Should it be reflex, the exciting cause should be sought till found and removed, when the spasm will cease.

VI. DISEASES OF THE STOMACH.

ACUTE GASTRITIS.

Synonyms.—Gastric Catarrh; Acute Dyspepsia; Simple Gastritis.

Definition.—An acute inflammation of the mucous surfaces of the stomach.

Etiology.—The most common cause of acute gastritis is errors in diet or method of eating. We live in age where competition is strong, and travel at a pace incompatible with health. The business man hurries through his meal, only partially masticating his food, and washing it down with large quantities of fluid. Children catch the infection, and hurry through meals in order to reach school or resume play, and this continued rush of American life is productive in a high degree of stomach disorders.

The character of food also must be considered; for tainted food, or that in which the fermentative processes are just beginning, act as irritants. Overloading of the stomach may be an exciting cause, as well as very hot, very cold, or highly-seasoned food. Alcoholic drinks are also responsible for many cases. Where there is a delicate stomach, a cold, with sudden arrest of secretions, may prove the exciting cause.

An attack of cholera-morbus may be attended with vomiting and retching of so violent a character as to be followed by gastritis. Certain diseases are said to predispose to this lesion; such as rheumatism, gout, syphilis, and tuberculosis. Chemical substances taken by design or accidentally must always be considered as irritants.

Pathology.—The changes in the gastric mucosa are similar to those of mucous inflammations of other parts. Beaumont's study of the inflammatory condition, through a gastric fistula in the person of St. Martin, shows a reddened and swollen condition of the membrane, while an increased secretion of mucus bathes the angry-looking membrane.

The gastric juice is deficient in hydrochloric acid, though lactic and butyric acids are in abundance. The mucous and peptic follicles are swollen, and appear granular, with infiltration of the intertubular tissue. The submucous tissue may become swollen and edematous, and ulceration may occur. Hemorrhage not infrequently occurs. The pathological changes are in proportion to the severity of the inflammation.

Symptoms.—They will depend largely upon the character and degree of the inflammation. In the milder forms, the local symptoms predominate, and are a marked feature in all forms.

In the milder form the symptoms are those of acute indigestion, the patient complaining of an uneasy sensation in the epigastric region; or there may be a burning sensation, or a dull pain with nausea, and sometimes vomiting. There is distention of the stomach, attended by eructations of gas, which give temporary relief. In children, diarrhea attends, though constipation is the rule in adults.

The tongue is coated, breath sometimes offensive, and patient complains of a bitter taste in the mouth. When food and drink are taken, the pain is aggravated.

In the severer form, all the above symptoms are increased, and chilly sensations precede the fever, which is quite active for a few days, the temperature reaching 102° or 103°. The pulse is frequent and hard, skin dry, bowels constipated, and urine scanty, highly colored, and deposits urates. The vomiting is more persistent, and consists of mucus, bile, and undigested food.

Where the gastritis is the result of swallowing the mineral acids, alkalis, corrosive sublimate, arsenic, etc.—toxic gastritis—the inflammation is intense, the pain severe, and vomiting and retching persistent. The burning sensation is felt in the throat and esophagus as well, and thirst is almost intolerable, the gratification of which increases the vomiting.

The pulse is feeble though frequent, the extremities become cold, the surface clammy, the face pinched and anxious, the fore-

runner of collapse. The breathing is shallow, and attended by pain. The position is dorsal, with limbs flexed to relieve the tension, the abdomen is tumid, and tenderness is marked; finally, in fatal cases, coma comes on, the breathing is shorter, and death ends the suffering of the unfortunate patient.

Diagnosis.—In the milder forms, where there is no fever, the diagnosis is readily made by the local symptoms, but where the disease commences with a chill followed by more or less fever, and there is no previous history of gastric derangement, the disease is readily mistaken for one of the infectious fevers, which mistake is only corrected by later developments. Where the gastritis follows the taking of corrosive salts, mineral acids, or drugs of any character, the diagnosis is readily made by the history and attendant symptoms.

Prognosis.—In the milder cases, commonly known as acute dyspepsia, recovery takes place in from twenty-four to forty-eight hours, while those of a febrile type may persist for several days, and, if followed by indiscretion in eating, the frequent recurrent attacks result in chronic gastritis. Where poisons have been taken, the case is more serious and may terminate in death.

Treatment.—In the milder form, all that will be necessary will be to wash out the stomach by having the patient drink freely of warm salt-water and giving the organ perfect rest for twenty-four or forty-eight hours, to be followed by a diet that is bland and easily digested.

In the more severe type, when the stomach is irritable, after the flushing, the small dose of aconite and ipecac will act kindly:

R	Aconite	gtt. v.	
	Ipecac	gtt. v.	
	Water	℥iv.	M.
	Sig. Teaspoonful every hour.		

Rhus tox. acts kindly, and where the pulse is sharp, the tongue red, with papilla elevated, rhus replaces the ipecac. Where the nausea and retching are persistent, an infusion of peach-tree bark will often be followed by relief, or bismuth subnitrate one dram, to water four ounces, will afford relief. If the bowels be constipated, they should be opened by an enema, or if the stomach will bear it, a glass of Rubinat condal or Hunyadi may be taken and freely open the bowels. If there be excessive acidity of the

stomach, a solution of sodium bicarbonate may be drunk *ad libitum*.

When poisons have been taken, the patient must be kept quiet in bed, all food by mouth restricted; but mucilaginous drinks may be allowed in small quantities. Ice-cream is grateful to the patient, and may be given sparingly. If the pulse becomes small and thready, and the respiration slow and labored, hypodermic injections of camphor and ether will be called for. This preparation, twenty grains of camphor to an ounce by weight of ether, is one of the most powerful of diffusible stimulants, and can be relied upon in desperate cases.

During convalescence, great care must be taken in the feeding, none but the blandest articles being allowed.

PHLEGMONOUS GASTRITIS.

Synonym.—Acute Suppurative Gastritis.

Definition.—A suppurative inflammation of the submucous and muscular coats of the stomach.

Etiology.—This is an exceedingly rare disease, and nearly always symptomatic, though it has occurred idiopathically as the result of traumatism or intemperance in eating and drinking. It usually follows in the wake of puerperal fever, pyemia, septicemia, and the exanthemata. It is found more frequently among males, and between the ages of twenty-five and fifty years.

Pathology.—The inflammation may be limited, gastric abscess, or diffuse. The seat of the inflammation is the submucous tissue, from which it spreads outward, involving the muscular and serous coats; and inward, invading the mucous membrane, thus giving rise to a honeycombed perforation. The limited form results in an abscess of greater or less proportion, which, rupturing, empties its contents into the stomach, or, perforating the walls of the stomach, empties into the peritoneum. In all cases the mucous and submucous tissues are dusky, softened, infiltrated, and break down during the suppurative process.

Symptoms.—These depend upon the primary lesion to a certain extent, the evidence of sepsis being more or less marked. Usually a chill marks the introduction of the disease, followed by fever, the temperature ranging from 103° to 105°. The tongue

is dry, brown, and covered with dirty sordes. There is great pain in the stomach, radiating to all parts of the abdomen. Nausea and vomiting soon follow, the ejected material being dark-brown or black in color, and composed of pus, blood, and bile.

The symptoms, now, are all typical in character; coma, with great prostration, occurs, and the patient dies in a comatose condition. There is usually a jaundiced appearance from the beginning.

Diagnosis.—This is very difficult during life, the symptoms being similar to those of other grave gastric troubles. The positive diagnosis is only made during a post-mortem.

Prognosis.—It is unfavorable, the disease terminating in death in a few days. The limited form may end in recovery, though not often, but runs a longer course before proving fatal.

Treatment.—This would be along the line of antiseptics, such as echinacea, baptisia, sodium sulphite, potassium chlorate, etc. To relieve the intense pain, hypodermic injections of morphia will be necessary.

PARASITIC OR MYCOTIC GASTRITIS.

Fungi sometimes infect the mucous membrane of the stomach, giving rise to the inflammatory process. The favus fungus has in this way given rise to gastritis as reported by Kundrat, while the sarcinæ and yeast fungi, in all probability, aggravate, if they do not produce, chronic gastritis. The anthrax bacillus has been known to give rise to ulceration of the mucosa, while the larvæ of certain insects produce a like effect. Diphtheria, tuberculosis, syphilis, and other infectious diseases, may attack the mucous membrane, giving rise to gastritis. In all of these, however, the symptoms are not sufficiently characteristic to be diagnostic.

CHRONIC GASTRITIS.

Synonyms.—Chronic Dyspepsia; Chronic Catarrhal Gastritis.

Definition.—A chronic inflammation of the gastric mucosa, increasing the mucous secretion, changing the character of the gastric juice, establishing conditions favoring the process of fermentation, enfeebling the contractibility of its muscular coats,

and so changing its integrity as to render normal digestion impossible, and frequently resulting in structural changes.

Etiology.—The same causes that give rise to acute gastritis, if continued, will result in this disease. In nearly all cases the causes may be summed up in a single word,—abuse. Rapid eating results in imperfect mastication and insalivation, and the coarse, starchy food, that should have been changed by the ptyaline into glucose, is washed into the stomach by one, two, or three cups of hot drinks or ice-water, either of which not only acts as an irritant, but also weakens the juices of the stomach to such an extent as to destroy largely their function.

Improper food, either as to quality or unfitness of preparation, is not an infrequent cause, while the use of alcoholic and malt liquors is one of the most common of all the exciting causes. Tobacco smoking and chewing are fruitful sources of dyspepsia, and lead to debility of the stomach.

The condition of the mouth must not be overlooked as an etiological factor. Neglect of the toilet of the mouth permits accumulations of food between the teeth and in cavities, which undergo decomposition, furnishing a rich soil for various bacteria, all of which find their way into the stomach to act as irritants.

The disease is not always primary, and constitutional causes must be recognized. Tuberculosis, syphilis, diabetes, Bright's disease, anemia, gout, and many others, are known factors in producing this lesion. All diseases affecting the portal circulation must be taken into consideration when looking for a cause. We are not to forget a very important, though often overlooked, etiological factor, that of chronic diseases of distant organs, the gastritis being reflex.

In this line, rectal diseases occupy a very prominent place. Hemorrhoids, prolapsus of the bowel, fissures, and fistulous ulcers, papillæ and undue contraction of the sphincter, so often give rise to gastritis that to overlook these points is to court defeat in attempting a cure. Disease of the uterus, ovaries, and tubes, the urethra and bladder, frequently come in for their share of the blame. Wrongs of the blood influence the secretion of the juices of the stomach, thereby impairing their function, causing more or less derangement.

Pathology.—Two forms are now generally recognized by

pathologists,—the simple and more common form, and the sclerotic.

In the first, the greatest changes take place in the mucous membrane near the pylorus, though, in the more severe and longer-continued cases, the entire mucous and submucous tissues are involved. The mucous membrane may be a bright-red or a pale or grayish color. It is covered profusely with a firm mucoid secretion. The swelling of the mucous membrane produces elevated folds, which give it a mammillated appearance, with here and there ecchymotic patches. This is especially marked at the pylorus, and where the submucous and muscular tissues are involved, there may be quite a marked degree of stenosis.

Erosions and follicular ulcerations are not uncommon. The microscope reveals a marked infiltration of the interstitial tissue, with fine cells and parenchymatous changes, especially degeneration of glandular cells.

Eichorst says: "The superficial epithelium of the gastric mucous membrane will be found involved in marked mucoid degeneration. The glandular cells exhibit granular turbidity, are in part shrunken and uniform, so that the differentiation between the parietal cells and the chief cells is lost. Accumulation of round cells, in greater or less number, has taken place between the gland tubules. The blood-vessels are dilated and greatly distended. Not rarely, remains of blood pigment are present, indicating and preceding hemorrhage."

As a result of this interstitial and parenchymatous change, the process may go on to complete atrophy, sclerotic gastritis, and may assume one of two forms: either a thinning of the coats of the stomach, simple atrophy, or phthisis ventriculi, where the normal size is retained or even increased, or there will be an enormous thickening of all tissues, resulting in a marked decrease in its volume. This is known as cirrhosis ventriculi.

In the first form there is a gradual increase in the interglandular tissue, resulting in a progressive degeneration or obliteration of the gland-cells and arrest of its function. The mucous membrane presents a thin, smooth, white surface, which is dry and devoid of mucus.

In the second form, there is also a destruction of the gland cells, and consequent loss of function, but in this case there is enormous thickening of the walls of the stomach, by the over-

growth of both connective tissue and muscular fibers. As a result of the hypertrophied tissues, the cavity of the stomach may be so lessened as to hold but a few ounces.

Symptoms.—In chronic dyspepsia, which is but another name for chronic gastritis, the symptoms are legion, and embrace a wide range both as to local and systemic manifestations.

Among the earlier symptoms are a sense of weight and oppression after eating, which may last for hours, and, as the patient expresses it, has the sensation as though he had swallowed a stone or piece of lead; in addition there is actual pain of a burning or cramping character. This may follow shortly after taking food or may not occur for three or four hours thereafter. Later on in the disease, flatulence is a common and distressing symptom, the patient being compelled to loosen the clothing to get the slightest relief. Accompanying this, there are eructations of gas, or gas and acrid fluids combined. Nausea is frequent, and occasionally vomiting occurs a short time after eating. Where the patient is addicted to the drink habit, there is apt to be vomiting in the morning.

The vomitus consists of food mixed with slimy mucus. The tongue is usually broad, pale, moist, and more or less heavily coated, the breath offensive, and there is a bitter taste in the mouth. Sometimes the tongue is red and sleek, or red at tip and edges.

In the more severe cases, as fermentation proceeds in the stomach, there is a spasmodic closure of the pyloric orifice, and, simultaneously with this, a similar spasm of the esophageal opening occurs, and the imprisoned gas distends the stomach till its presence upon the sensitive nerves of the heart brings on palpitation and frequently excruciating pain in the cardiac region, known as *cardialgia*. The patient, thoroughly alarmed, presents a frightened or anxious appearance, and the attack increasing in severity, gives rise to vertigo, and the suffering is not infrequently relieved by the patient becoming unconscious.

The appetite is capricious, sometimes ravenous, though, as a rule, there is but little relish for food. Digestion is slowly and but imperfectly performed; hence there is a period in nearly every case of chronic gastritis of diarrhea. The undigested food, passing into the intestinal canal, acts as an irritant, and frequent stools follow. This is, in turn, followed by constipation; the

bowel, failing to respond to the irritant, becomes sluggish, there is an excess in the secretion of mucus, and the stools are more or less incased in mucus.

Headache is common, and, of all men, the dyspeptic is the most miserable. He becomes melancholy, and the world is a vast vale of tears. Hydrochloric acid is usually deficient, though butyric, lactic, and acetic acids are found in abundance.

On washing out the organ, we find undigested food that has lain for hours in the stomach. A microscopic examination reveals various bacterial organisms, yeast fungi, and the *sarcinæ ventriculæ*. A viscid, slimy mucus is found in large quantities, and the pale and doughy skin, together with a like abdomen, tells of general atony.

A stomach cough is sometimes a distressing symptom, and in one case that came under my notice the cough was the most distressing feature, and the one condition for which he came for treatment. When informed that his trouble was in the stomach, he doubted the diagnosis; but a few months' treatment directed entirely to the stomach effected a complete cure.

Although dull and drowsy after a meal, the patient may become perfectly wide awake on retiring, and insomnia may be one of the most troublesome and intractable symptoms.

Diagnosis.—If attention be paid to the following points, the diagnosis is easily made: 1. History; the period of dyspepsia being very lengthy. 2. Carefully noting the afore-described symptoms. 3. By examining the contents of the stomach at different intervals after eating. If we remove, by the stomach tube, the contents of the stomach one or two hours after a meal, we find very little hydrochloric acid, but a great deal of mucus, butyric, and lactic acids. If the tube be used in from six to seven hours after a meal, we still find undigested food in the stomach, whereas in functional dyspepsia the stomach should be empty.

There may be some doubt in distinguishing this from cancer, where there is no tumor present, though even here we would have the pronounced cancerous cachexia in the latter disease, and also the presence of the coffee-ground material. In ulceration of the stomach, the boring, gnawing pain, together with vomiting of clotted blood, and the hyperacidity of the gastric contents, enables one to be quite positive in his diagnosis.

Prognosis.—This will be favorable in the large majority of cases, unless there be a malignant complication, gastric ulcers, or structural change in the tissues of the stomach. Remembering that it is often reflex, our attention is early turned to the orifices of the body, which often saves one weeks or months of useless medication. The most satisfactory results may be obtained if we keep in mind the *nature* of the disease, and do not attempt to cure the patient in a few weeks.

Treatment.—One of the most important means to insure a successful treatment is to impress your patient with the importance of following instructions to the very letter. Be *positive* in directions as to *diet*, and the battle is won before a dose of medicine is administered.

The diet, then, is of first importance. I find it a good plan to name the articles of diet that *may* be eaten before I give my list of don't's; for if you begin by naming a long list of edibles that are to be strictly forbidden, your patient is at once discouraged. I do not believe in *fasting*, so say to my patients, you can eat the following articles, unless you find by experience that they do not agree with you: Rare, broiled, tender beefsteak; rare roast-beef, inner cut; broiled or roast chicken; stewed or broiled sweetbreads; young squirrel or lamb chops—these meats to be taken sparingly.

Of vegetables, a small baked potato, young and tender string-beans, young peas, spinach, etc. Light bread, at least twenty-four hours old, and cooked fruits of a subacid character. After naming this diet, the patient is your friend; he has been told that he is to live on skimmed milk, and he is charmed to find plenty of wholesome food on his diet list.

Now name the forbidden articles. No *pork* in any shape, no *veal*, no *smoked* or *pickled* meats, no *duck* or *geese*, *nothing fried*, no greasy food, and, as all fried victuals are greasy, this method of cooking *must be* avoided; no *hot* bread, no *biscuits*, *muffins*, *waffles*, or *griddle-cakes*; not very much in the line of sweets are allowed, and honey, syrups, jams, and preserves are also to be forbidden. *Pies*, *rich pastries*, and *puddings* are also to be placed on the forbidden list. The patient has agreed to all you have said about the diet, but now you must be firm in your last restriction.

No fluids to be drunk *during a meal*; in other words, a *dry*

diet. No *tea, coffee*, milk or water, *while* eating, nor for *two hours* afterward. This is where the greatest fight is to be made. Your patient has acquiesced in all that you have said thus far, but when you say *no fluids*, he resents advice. Explain why he should avoid fluids, and he is won over. Tell him the reason of your restriction; that if he does not drink while eating, he will more thoroughly masticate his food; that in mastication the salivary glands are excited, and the food becomes moist with this secretion; that the ptyalin contained in the saliva converts the starchy portion of the food into glucose while yet in the mouth, and that one of the most important steps in digestion takes place in the mouth; that this step is destroyed when he drinks during a meal; that the food is bolted, or washed into the stomach imperfectly masticated and imperfectly salivated; that the gastric juice can not do the work of the saliva. Then, again, tell him that when he drinks while eating, the juices of the stomach are so diluted that digestion is delayed, that fermentation begins, and the nutrition of the food is largely destroyed. Tell him that man is the *only* animal that drinks at his meals, and that he is the *only one* that has dyspepsia. After talking to him in this common-sense way, he sees the reasonableness of the order, and is ready to obey to the letter. Of course, if he is a drinker of spirituous and malt liquors, these will have to be discarded; it is the price he has to pay to secure health.

The meal should never be eaten hurriedly, and all business or social cares should be left behind. The meal, however, should be a pleasant one, when all care is banished. Of course there will be some patients that can not have so liberal a diet as that already outlined, and they may even be restricted, for a few weeks, to milk and lime-water, malted milk, buttermilk, albumen water, chicken-broth, oyster-soup, or lamb-broth.

What will agree with one patient can not be taken by another, and the patient is to understand that, when he finds an article which disagrees with him, he is to *discard it*, even if he does find it on his list of things allowable.

Hygienic measures are of great importance. The patient should be in the open air as much as possible. All exercise, however, should stop short of fatigue. Walking, horseback riding,

bicycling, boating, and light gardening, are all beneficial if not severe. Breathing exercises are among the most beneficial.

A cold sponge-bath, followed by a vigorous rub down with a coarse towel, will set the blood to moving in the capillaries, and prove of benefit. When the patient has the means, a change of climate or place will work wonders. A visit to the seashore, to the mountains, or to the lakes, will put new life into the patient; new faces and new scenes enable the patient to *forget* that he has dyspepsia, and his eye grows brighter, a new color comes to his cheek, the coating disappears from the tongue, and the patient, by getting away from himself, has assisted the physician in effecting a cure.

Medicines.—Before giving any remedy, we are to remove, as far as possible, any cause that is producing or continuing the disease. I have already called attention to the rectum, uterus, and urethra as outside causes, and where these troubles exist they should be corrected before medicating our patients. If associated with renal, hepatic, or cardiac lesions, our attention must be directed to these as well as to the local disease.

In order to receive the best results from our remedies, we must place the stomach in such a condition that our medication can be readily appropriated. If there are large quantities of tenacious, viscid mucus in the stomach, our remedies will fail to influence the disease. It is of prime importance, then, to get a clean stomach for our base of operations. This can be best accomplished by the lavage tube, and, though disagreeable and unpleasant at first, the patient soon becomes accustomed to it, and can readily wash out the stomach without the aid of the physician. One of my patients had a nozzle and a stopcock attached to a fountain syringe; then, introducing the tube into the stomach, she would slip the free end of the tube on to the nozzle, turn on the water by means of the stopcock, and when the proper amount of water had been taken, a simple turn of the thumb and finger cut off the supply, and, slipping the tube from off the nozzle and depressing the end, the stomach would be emptied of its contents; then, without removing the tube from the stomach, she would again attach her hose to the nozzle, turn on the stream, and proceed in this manner till the water returned clear. We may use plain warm water or a weak solution of salt water; or a small quantity of sodium bicarbonate or boracic acid may be added.

If there be hyper-acidity, it is good treatment to allow four or six ounces of the alkaline water to remain in the stomach. If there be much mucus and the gastric juice is excessively acid, it is frequently due, not to hydrochloric acid, but to the organic acids; in such cases the administration of hydrochloric acid will be attended with much benefit. If there be atrophy of the peptic glands and a defect of mucus, a reliable preparation of pepsin will prove of great benefit. With this exception, however, the beneficial effects of pepsins are greatly exaggerated. Pancreatin is also of much value in cases of this kind.

℞ Nux Vomica.....gtt. x.
 Phosphate of Hydrastin.....grs. x.
 Water℥viii. M.
 Sig. Teaspoonful every four hours.

This will be one of the best prescriptions where there is general atony, pale tongue, slight nausea, bad taste in the mouth and a white ring around the lips.

With these conditions there is generally fullness of the abdomen, sluggish condition of the bowels, doughy condition of the skin, and all the evidences of atony at large.

Where there is great irritation of the stomach, small doses of aconite and ipecac will often give relief, though their happiest effect is to be seen in the acute disease. An infusion of the bark from young peach-twigs will nearly always give relief where there is great irritation.

Where there are acrid eructations, attended by a burning or scalding sensation, known as water-brash, subnitrate of bismuth or liquor bismuth will be useful. Where there is marked tenderness over the epigastrium, the older Eclectics obtained excellent results from the application of the old compound tar-plaster, known as "irritating plaster." This was allowed to remain till it produced a crop of pustules, after which it was dressed with simple cerate. As soon as it was healed, a fresh plaster was applied, and this treatment continued till all irritation disappeared. The same results may be obtained by the use of the thapsia plaster, which is not quite so severe; or we may use the old vinegar pack, which consists of a towel wrung out of vinegar-water, and applied on going to bed, a dry roller bandage applied over this; on rising, the pack is removed, and the abdomen sponged with salt water.

Where there is torpor of the liver, with pasty, yellowish coating on the tongue,—

℞ Tincture of Leptandra.....dram ss.
 Nux Vomica.....gtt. x.
 Waterʒiv. M.
 Sig. Teaspoonful every four hours.

The second or third trituration of podophyllin will also be found very useful in these cases. Where the patient is constipated, fifteen or twenty grains of sodium phosphate two or three times a day will be found to give good results, though the prolonged use of any cathartic is to be discouraged; rather have the patient resort to kneading the bowels for five minutes in the morning before rising; after which instruct him to drink a glass of cold water, to which is added a drop of nux vomica, and after breakfast, at a regular hour each day, solicit a stool. This method, if persisted in regularly for several weeks, will overcome the most persistent and obstinate constipation. To encourage the bowels to move, the first few days an enema of glycerin four ounces, to water one pint, may be used.

As the gastric irritability subsides, or if a hypersecretion of mucus has been overcome, a tonic treatment will be of marked benefit. The old compound tonic mixture, the triple phosphate of iron, quinia, and strychnia, will be found beneficial in half-teaspoonful doses.

Nux and hydrastin are also quite helpful in these cases. Where the skin presents a yellowish or tawny appearance, chionanthus will afford relief.

When the patient grows nervous, and the pulse shows cardiac irritability, pulsatilla and cactus will be called for. Dr. Webster speaks very highly of tincture of aploppapus laricifolius in from two to ten drop doses with these same symptoms.

DILATATION OF THE STOMACH.

Synonyms.—Gastrectasis; Gastrectasia.

Definition.—An acute or chronic enlargement of the gastric cavity by over-distention, resulting in the retention, for a long period, of food and the products of digestion.

Etiology.—Dilatation of the stomach may occur either as an acute or chronic condition, though the former is the more rare. Acute dilatation is the result of enormously dilating the stomach either by food or drink, especially the former, which may result in paralytic dilatation.

The chronic form more frequently results from stenosis of the pylorus than all other causes combined. This may be due to cancerous infiltration, to ulceration and subsequent cicatrization, or to thickenings of the tissues, the result of chronic inflammations. It may also be due to adhesions from below, as of the liver, pancreas, and gall-bladder, or from pressure from without by tumors or malignant growths.

In rare cases the stenosis is congenital. According to Kussmaul, the stomach may assume such a position as to twist the pylorus in such a way as to produce stenosis. Dilatation, however, may occur without a narrowing of the pyloric orifice, as the result of atony of the muscular coats due to gormandizing, fearfully distending the stomach by ingesting large quantities of food or drinking large quantities of beer. The erosion of the mucous membrane in chronic gastritis may weaken the organ to such an extent as to furnish conditions favorable for distention. Impairment of the nerve-supply, together with faulty nutrition, will give us enfeeblement of structure, and thus lead to increased capacity.

Pathology.—We are to remember that an abnormally enlarged stomach does not necessarily mean dilatation of the organ. According to Ewald, a recognized authority on gastric troubles, the incapacity of the stomach to come under the head of dilatation must be fifty-three ounces or more. Where the dilatation is extreme, the intestines are crowded downwards into the pelvis, while the liver, spleen, and diaphragm are made to occupy a much higher position than the normal. The character and degree of the dilatation also vary. Thus, where the dilatation is the result of stenosis of the pylorus and final thinning of all the gastric tissues, the distention is regular and uniform, while in cases where erosions or ulcerations precede the distention, there the dilatation is extreme.

My colleague, Dr. W. E. Bloyer, reports a case of dilatation in a young woman, where anemia and general debility were the

causal factors, which extended to within a few inches of the pubes, or to a line drawn from the crest of one ileum to the other.

Where there is pyloric stenosis, the first effect is hypertrophy of the gastric walls; but later this is followed by atrophy, the walls becoming very thin, and the muscular fiber may show fatty degeneration. Where there is no stenosis, the walls become exceedingly thin, the muscular fibers becoming only a trace of the original.

Symptoms.—The early symptoms of dilatation are not at all characteristic, and depend largely upon the causes producing the lesion. There is always evidence of indigestion, and in the acute form there may be pain and tenderness in the epigastric region. There is an unpleasant sensation in the cardiac region, finally amounting to palpitation, extreme pain, sometimes resulting in unconsciousness.

In the chronic form, the most characteristic and diagnostic symptom is the vomiting of large quantities of food and blood, from one to three gallons at intervals of from one to three days. The vomitus consists of particles of food from several meals, mixed with more or less mucus, and is sour and foul-smelling; lactic, acetic, and butyric acids, and various bacteria, *sarcinæ*, and yeast fungi are found in abundance. Fermentation is rapid, the mass being frothy, and, on standing, separates into three layers,—“a brownish foam, a middle layer of yellowish brown, and finally a layer of cloudy liquid and undigested food.” (Ewald.)

The appetite is variable, though hunger and thirst are usually marked features. Where there is stenosis, there is usually constipation of an obstinate character. There is frequent retching of an acrid and offensive material, attended by a burning sensation. The tongue is always coated, and the breath unbearably fetid. The gradual dilatation produces cardiac disturbances, such as palpitation or dyspnea.

The skin is dry and constricted, and as nutrition and assimilation are more and more marked, emaciation is progressive. Kussmaul was the first to call attention to tetanoid spasms resulting from dilatation of the stomach. They were attended by pain, and occurred in the foot, leg, calf, hand, arm, and abdominal muscles.

Physical Signs.—Inspection.—The knowledge obtained by inspection depends largely upon the condition of the abdominal walls. If thin and the dilatation is marked, a bulging of the left hypochondria, the epigastrium, a portion of the right hypochondria, and also a portion of the umbilical regions, will be noted, the greatest fullness being on the left side. If the bulging be very low, the "troughlike depression" of Ewald is seen immediately above it, and is most likely the result of the long axis of the stomach assuming a vertical position. When this distention is not visible, it may be seen by inflating the stomach by means of a pump.

Percussion.—The outline of the stomach can be readily made on distending it with air, as above described. If the transverse colon be distended with gas, and doubt exists as to the condition, have the patient drink freely of water, one or two pints, and, while standing, percuss the same region, and the dullness will be readily outlined, the resonance beginning immediately above.

Auscultation.—The splashing sound heard one or two hours after drinking is suggestive of dilatation, and if the stomach be siphoned after the above test, and the splashing sound disappears, the evidence is conclusive.

Diagnosis.—This is reasonably positive, if the symptoms already noticed are kept in mind. The vomiting of large quantities of food every two or three days, the chemical condition of the vomitus, and the physical signs already named, are sufficient evidence to warrant a diagnosis; however, an abnormally large stomach may be confused with one of dilatation.

Prognosis.—In some of the acute cases, the prognosis is favorable; but in the chronic forms, the prognosis is unfavorable, and a careful and guarded statement should be made to the patient. Thus, if the dilatation be due to stenosis, the result of malignant infiltration, not only will there be no amelioration in the patient's condition, but death will follow speedily; while in stenosis from other causes, the prognosis will be favorable as to life, but unfavorable as to a cure for the dilatation.

While, in rare cases, a dilatation, resulting from enfeebled condition of the walls of the stomach, may be permanently cured, in the great majority of cases, such changes have taken place in

the tissues as to preclude a permanent cure, though treatment may render the patient quite comfortable.

Treatment.—Lavage, which was first introduced by Kussmaul in 1867, is one of the most important parts of the treatment. By this method the stomach is relieved of all irritating substances, the process of fermentation prevented, and the stomach, cleansed and emptied, is given an opportunity to rest and contract. The many distressing symptoms which result from indigestion are thus avoided. Vomiting is less frequent and gastric distention reduced to the minimum.

In the more pronounced cases, the stomach should be washed out daily, though two or three times a week will suffice after a few weeks' treatment. We can use asepsin in the water where fermentation is marked or where the odor is offensive. Where the mucus is abundant, sodium bicarbonate will be of much benefit. Boracic acid is also useful in many cases. Siphon out the fluid till it leaves the stomach perfectly clean. Some cases will be benefited by allowing several ounces of the alkaline wash to remain in the stomach.

The best time for washing out the stomach is just before breakfast or before the midday meal, thus interfering as little as possible with digestion. Should there be ulceration, and the introduction of the tube result in much pain, lavage will have to be abandoned.

Next in importance is the diet of the patient. He should take as little fluid as is consistent with health. All food taken must be of the most digestible nature, and be taken in small quantities. Starchy, fatty, or sweet foods should be restricted. Predigested foods are well received, and produce but little discomfort. Peptonized milk and meat preparations are valuable. Alcoholic and malt drinks are to be prohibited.

To add tone to the stomach and increase the muscular power of the organ, nux vomica and hydrastin phosphate will be found of special worth. Strychnia will be useful for the same conditions. Galvanism and faradism will also be found useful in stimulating muscular contraction. Rubinat condal, Hunyadi, or Carlsbad waters will relieve the constipation that attends nearly all these cases.

GASTRIC ULCER.

Synonyms.—Peptic Ulcer; Rodent Ulcer; Round Ulcer; Penetrating Ulcer, etc.

Definition.—A well-defined round or oval ulcer, due to the action of the gastric juice upon some portion of the mucous membrane, which has been weakened by some impairment of nutrition. It penetrates the mucous membrane and sometimes the entire gastric wall.

Etiology.—Dyspepsia in its various forms undoubtedly predisposes to peptic ulcer; in fact, any disease whereby the blood is impoverished favors this condition. The fact that about five per cent of all autopsies held show either ulceration or cicatrization is evidence that the disease is more frequent than is generally known.

It is more common in females than in males, possibly due to the method of dress, the stomach being pressed by corsets and tight lacing, and partly due to closer confinement. Tailors and shoemakers are prone to this condition, due, most likely, to position, causing pressure upon the stomach. It occurs most frequently in persons between the ages of twenty and forty, though it is not infrequent in children.

The exciting cause is no doubt hyperacidity of the gastric juice and the mucous membrane being digested, as it were, by its own juices. Chronic gastritis often precedes, and no doubt is often the cause of the ulceration. Some pathologists regard the disease as a neurosis. The disease is quite often secondary to anemia and chlorosis, and in women with menstrual disorders. These diseases tend to acidity of the blood, thereby favoring the digestion of the mucous surface.

Traumatism of the stomach or external injuries over the epigastrium have also been regarded as being responsible for this condition.

Pathology.—Usually there is but a single ulcer, though two or more are not uncommon, and Berthold reports a case where he found thirty-four ulcers. The usual location is near the pylorus and on the posterior wall, though they may be found in any portion. The shape is generally round or oval, with clear-cut, well-defined edges. In the more acute form it has the appearance of being made with a punch, and there is but little, if any,

inflammation of the neighboring tissue, but in the more chronic variety, the edges are not so clear-cut, and infiltration gives them an indurated condition.

In size they vary from that of a dime to an inch or more in diameter, and when of undue size, the result of the coalescence of two or more, they are usually funnel-shaped, and extend to various depths, the base consisting of the submucosa, the muscular tissues, or, perforating the organ, may have for its base new tissue, the result of adhesions which nature has formed to prevent a fatal issue. Thus adhesions may form with a portion of the left lobe of the liver, with the pancreas, the spleen, the omentum, or the diaphragm.

The perforation may be into the lesser peritoneal cavity, giving rise to subphrenic pyo-pneumothorax; or it may enter the pleura, the gall-bladder, the transverse colon, and even the ventricle of the heart. Where the ulcer is located on the anterior wall and perforation occurs, it most frequently produces peritonitis, terminating in death. Again, the ulcerative process may penetrate the blood-vessels, giving rise to hematemesis, and if of the larger vessels, as the splenic artery, a fatal hemorrhage results.

In the chronic ulcer of long standing, there is more or less gastritis associated with the ulceration.

In the healing process various changes result. Where the ulcer is superficial, extending simply through the mucous membrane, cell infiltration takes place, the edges contract, and the cicatrix is smooth and sometimes invisible. Where the ulcer is located near the pylorus and extends to the muscular tissues, the contraction results in stenosis, which is followed by dilatation. Where several ulcers are found near the middle of the organ, forming a girdle, as it were, the cicatrization and contraction give rise to the hour-glass form.

In some cases there is no attempt to heal, and the ulcer presents an irregular, ragged appearance, with indurated edges. The adhesions of the stomach depend upon the location of the ulcer, and while nature has kindly prevented a fatal issue by her handy work, the contractions attending the same are sometimes followed by severe pain, which is difficult to relieve.

Symptoms.—These may be so pronounced as to render a diagnosis almost positive, or so obscure that the disease is only

determined post-mortem. In the earlier stages the symptoms are those of dyspepsia or chronic gastritis; but as the disease progresses, the more positive symptoms, pain, vomiting, and hemorrhage develop, and when all are present ulceration of the stomach is assured.

The pain at first is but slight, and consists of a burning or gnawing sensation, more marked after eating. As the disease advances, the pain increases, and is present a great deal of the time, though most severe immediately after taking food, especially very hot or very cold fluids, also very acid or very highly-seasoned dishes, and where the food has been but poorly masticated. In some cases the pain is severe when the stomach is empty, the opposing surfaces producing enough irritation to cause suffering.

Pressure sometimes gives relief, and the patient may lie across a chair or at full length upon the floor. Usually, however, there is tenderness over the epigastric region, and the patient can not bear anything tight over the stomach. The pain is circumscribed, and located just below the xiphoid cartilage; from this point it may radiate to the back between the scapulæ, and also to the abdomen. A corresponding painful point is over the eighth, ninth, or tenth dorsal vertebra; prolonged exertion or emotional excitement increases the pain. In advanced cases, the *gnawing*, *boring*, or *burning* pain, confined to a spot about the size of a silver dollar, just below the ensiform cartilage, is a characteristic symptom of much value.

Nausea is one of the early symptoms, with loss of appetite; but as the disease becomes more chronic, vomiting occurs in perhaps half the cases. This usually occurs in from one to two hours after eating. The vomited material usually contains an excess of hydrochloric acid. As a result of the inability to retain food, the patient loses flesh and strength, and presents an anemic appearance.

Hemorrhage is a symptom of great importance, and, when preceded or accompanied by the others above mentioned, is almost conclusive evidence of the disease. It varies very greatly, sometimes so slight as to pass unnoticed, the blood passing into the bowel thus escaping notice; at other times, it is so profuse as to endanger life, though this is very rare.

Where the hemorrhage is from the smaller capillaries, it is

mixed with the vomitus, and appears about the color of coffee-grounds. Where the ulceration eats into an artery, the hemorrhage is more profuse, and is ejected as clear blood, or, remaining in the stomach for some time, is finally vomited in large, dark clots. When it passes into the bowel, the stools are tarry in character. Where the hemorrhages are frequent and profuse, the patient soon presents an anemic appearance. When perforation occurs in the abdominal cavity, peritonitis ensues, should the patient not succumb to collapse.

Diagnosis.—A well-marked case of ulceration, with the three characteristic symptoms—*pain* of a *boring*, *gnawing*, or *burning* character, located at or just below the xiphoid cartilage, and which point can be covered by a silver dollar; *vomiting of food* highly acid in character from a few minutes to two hours after eating, and *hemorrhage* in either large or small quantities—makes the diagnosis plain; but when hemorrhage is absent, which is the condition in fifty per cent of all cases, the diagnosis is not so clear.

Where there is severe gastralgia, and it is confined to a small surface, with a painful dorsal point, and vomiting of a highly acid character, we are justified in making our diagnosis. In gastralgia, which is most likely to be confounded with this, the pain is more diffuse and not so persistent.

Eating in most cases gives relief for some time; while in ulceration it only aggravates. Vomiting affords relief in ulceration, while in gastritis there is but little relief, if any. In ulceration, there is not the hard, indurated tumor that is found in cancer, nor do we find the vomited material in the latter disease so acid in character. Eating produces but little additional pain in cancer, while pain is intensified by taking food in ulcer. The age of the patient is somewhat significant, as cancer usually appears only after middle life. A certain per cent of cases, however, are only recognized post-mortem.

Prognosis.—This depends upon several conditions, such as the duration, extent, and whether or not there has been hemorrhage. In recent cases the prognosis is favorable, while many of a more chronic character recover. When perforation occurs and there is much structural change, our prognosis should be guarded. Taking all cases, from sixty to eighty per cent recover.

Treatment.—In the earlier stages the treatment will be similar to that for gastritis, which it so closely resembles; but as soon as the symptoms are sufficiently pronounced to warrant a diagnosis, the patient must be put to bed and kept absolutely quiet. He must be given to understand that a cure means from four to six months in bed. Nothing will take the place of rest in the recumbent position. The diet must receive particular attention, for the most skillful line of medication will fail if we neglect this phase of the treatment. Only the blandest and most easily digested food should be allowed, peptonized foods being among the best. Where there is great irritability of the stomach and vomiting, the stomach should have absolute rest, nourishment being given by the rectum. As soon, however, as the stomach will tolerate food, I prefer giving it by mouth.

Pepsin whey is one of the blandest and most kindly received foods that can be given; malted milk, Eskay's food, and Wells, Richardson Co.'s cereal milk are also well received. It is a good plan to change the food every two or three days, so that the patient will not tire of any one food. Where the stomach is in a rebellious mood, albumen water is generally well received. The white of one egg, stirred in a half glass of water, and taken at one time, or, in smaller quantities, one or two hours being consumed in the taking, will be found helpful. Bovinin is highly recommended, although I have used it but little, and can not speak from experience.

Some patients do well on ice-cream. After a few days or weeks the dietary may be enlarged, and may be made to include scraped beef, well-cooked rice, sweetbreads, the white meat of chicken, lamb, or clam-broths and cooked fruits, care being taken not to overfeed.

The administration of remedies will be selected for the special conditions present. To relieve the nausea and vomiting, an infusion of peach-tree bark will often give most happy results, or mint-water and bismuth subnitrate. Where the vomiting is persistent, the stomach should be washed out with a weak solution of sodium bicarbonate, though much care must be taken in using lavage, or harm, rather than good, will result.

If there be increased secretion, hamamelis, collinsonia, and liquor bismuth will be of benefit. Lloyd's colorless hydrastis is also a good agent in this condition. Where there is constipation,

a glass of Hunyadi or Carlsbad water will be useful; the latter may be improvised by taking sodium sulphite five ounces, sodium bicarbonate two ounces, and sodium chloride one ounce; of this add a heaping teaspoonful to one pint of warm water, and drink freely. This is useful in overcoming the excessive acidity of the stomach.

Where there is passive hemorrhage, *carbo-vegetabilis* 2x, in ten-grain doses, will do nicely, but when the bleeding is active, ergot, hypodermically, will succeed better. For intense pain, morphia, hypodermically, will give relief, but should be used cautiously, that the patient do not contract the morphia habit. Where the hemorrhage is so profuse as to endanger life, intravenous injection of normal saline solution will be called for. Where perforation occurs, prompt surgical measures should be taken.

The older Eclectics secured good results from counter irritation, using the old compound tar-plaster, but patients of to-day would hardly submit to such unpleasant methods; for, to be effective, it must be carried to suppuration. A very good counter-irritant, however, used over the dorsal point, is a little chloral hydrate spread upon adhesive plaster, say about the size of a silver dollar. A vinegar-pack over the abdomen at night, to be followed by a sponge-bath of salt water the following morning, is also good treatment.

During convalescence, great care must be exercised that the patient be not allowed to gratify his appetite.

CANCER OF THE STOMACH.

Etiology.—The stomach seems to furnish a soil more favorable for the development of malignant growths than any other organ, for it occurs more frequently in this structure than any other, according to Einhorn, and second in frequency according to Osler, who gives the uterus as ranking first.

The exciting or actual cause of cancer of the stomach, like that of cancer of any organ or part, is not known, though certain factors or conditions predispose to the lesion.

Age.—First in order is *age*, the disease rarely occurring during the first twenty-five years of life, while seventy-five per cent of the cases are found between the ages of forty-five and seventy years.

Sex.—Hospital statistics show a slight increase in favor of males, though, as Einhorn well remarks, this proves but little, as a predisposing factor for the percentage of males treated in hospitals is larger than that of females.

Race.—The white race is far more liable to cancer than the colored, according to hospital reports.

Heredity.—This does not figure so extensively as one might expect, though it has some slight influence.

Chronic gastritis and *ulceration* are assigned as etiological factors; yet the percentage of cases where these conditions preceded the disease is quite small, and the gastritis found after death is most likely secondary.

The most frequent site of the disease, the pylorus, is explained by Brinton to be due to the greater amount of work or contraction of the muscular fibers at this point than in the rest of the structure. When the pylorus is involved, the upper portion of the duodenum usually shares in the destructive process.

Pathology.—Carcinoma has a predilection for the pylorus, according to Lebert, this portion being involved in fifty-one per cent of all cases, sixteen per cent affecting the lesser curvature, nine per cent affecting the cardiac orifice, while only four per cent involve the greater curvature.

The most common varieties are the encephaloid carcinoma, scirrhus carcinoma, adeno-carcinoma, and colloid carcinoma.

They always commence in the mucous layer, extending to the submucous, muscular, and serous coats.

The general appearance, character, and consistency depend, to a great extent, upon the variety, and may be quite limited or involve a large portion of the organ.

In all but the scirrhus, the surface presents an ulcerated condition with frequent "cauliflower" projections. The softer forms involve all the tissues of the stomach by infiltration, and are usually of a grayish-red color, owing to the amount of blood contained.

In the scirrhus form, a hard, indurated mass is formed, the resulting changes depending upon its site. Where the pylorus is involved, there is apt to be dilatation of the organ and increase in size, while an involvement of the cardia gives rise to atrophy of the stomach and dilatation of the esophagus. In rare cases,

the growth takes possession of the entire organ, almost obliterating the cavity.

In one post-mortem of this variety, I found its capacity reduced to about one tablespoonful or less.

In the colloid variety, there is more universal invasion as a rule, and it more frequently extends to neighboring parts. Metastasis to other organs is not infrequent, the lymphatic glands suffering most frequently, after which the liver is next in frequency.

The omentum, intestines, spleen, lungs, pleura, and, in fact, any organ may share in the destructive process.

Adhesions sometimes take place between the stomach and liver, or the pancreas, colon, or abdominal walls may suffer in the same way.

Microscopically, the tubular lymph spaces are seen to be filled with columnar epithelium. In some cases adenomatous growths will be found in some parts of the growth; hence the term, adenocarcinoma.

In the scirrhus variety, there is massed between the groups of cells a large amount of firm fibrous connective tissue, which accounts for the hardness of this form of carcinoma.

In the softer varieties, there is usually more or less erosion of blood-vessels, accompanied by more or less hemorrhage.

Perforation of the stomach is one of the rare complications. Since the gastric tubules are early involved, and later destroyed, there is necessarily a diminished amount, and in some cases an entire absence of hydrochloric acid. Anemia is present in every form of carcinoma, and the patient has a characteristic appearance known as cancerous cachexia.

Symptoms.—These present a wide range, from that so slight that the disease is only recognized post-mortem, to those characteristic of the most typical type, between which are every grade. A better idea may be formed by dividing the symptoms into general and specific, or functional.

General Symptoms.—The most constant symptom is the gradual and progressive loss of flesh and strength, though we meet with exceptional cases, where the patient retains his weight and strength to the end. There may be periods in this progressive emaciation, when, for a time, the general atrophy is stayed, and even an increase in weight gives encouragement to the patient,

which only lasts, however, for a short period: thus a treatment that relieves the catarrhal condition, so constant in this disease, is a nutritious and easily digested diet. The same may be true of a strong mental impression, such as a favorable prognosis by a consulting physician, or the promise of a cure by Christian science, faith-healer, or magnetism.

The loss of strength is usually proportionate to the loss of flesh, though, where there is a temporary gain in flesh, there is not a proportionate gain in strength. With the general decline, there is, of course, a progressive anemia, the patient assuming a yellowish, cachectic appearance that is characteristic.

In about half the cases, fever rises in the advanced stages, though usually the temperature does not run very high. In exceptional cases the temperature is subnormal. Constipation is the rule, though a troublesome diarrhea is occasionally the exception. The stools, where there has been much hemorrhage from the stomach, are black and tarry. In the advanced stages of the disease, there is edema of the ankles, and not infrequently general anasarca.

Functional Disturbances.—Loss of appetite, with symptoms of dyspepsia, is common in all forms of cancer of the stomach, and, though occasionally a patient may retain his appetite to the end, it is quite exceptional.

With the anorexia comes nausea and vomiting; at first, at quite long intervals, but as the disease progresses, the vomiting becomes more frequent and persistent, especially when the orifices are the parts involved. If the cardiac orifice is the seat of the disease, the vomiting occurs at the time, or shortly after eating, while it is delayed for some hours if the pylorus is involved. The ejecta consists of food, mucus, various acids, yeast fungus, bacteria, and sarcinæ, though not so often as in dilatation from stricture, and the whole mass is foul-smelling and sour.

There is almost always an absence of hydrochloric acid, and though it may be present in rare cases, its absence is considered of great value as a diagnostic feature. To determine its presence have the patient eat a roll, with a glass of water or tea, without sugar or milk, and in about one hour draw the contents by means of the lavage tube.

Gunzburg's test for hydrochloric acid is perhaps as easily made as any, and is certainly as reliable. It is as follows: Take

phloroglucin, grs. xxx; vanillin, grs. xv; absolute alcohol, one ounce. To two or three drops of this reagent, add an equal number of the gastric filtrate, in a porcelain dish, and slowly evaporate to dryness over a flame; if hydrochloric acid is present, a rose-red tint will appear along the edges. So delicate is the test that it will reveal acid, if present, in the proportion of one to twenty thousand.

Hemorrhage occurs in a large per cent of the cases, but not in large quantities. As the oozing of blood takes place, it is acted upon by the changed gastric secretions, and is changed to a dark coffee-ground color. While the "coffee-ground" vomit is present in cancer of the stomach, we are not to forget that it is also present in gastric ulcer.

Pain is one of the common symptoms, and is present in nearly every case, though some cases have run their entire course without this dread condition. The pain is most frequently located in the epigastrium, though it may be between the scapulæ underneath the shoulder-blade, or in the dorsal and lumbar region. It is of a burning, gnawing, twisting, or lancinating character, and occurs when food is taken, and, later in the disease, is nearly always present.

Physical examination is of the greatest importance, and reveals more positive knowledge than all other symptoms combined. Have the patient lie on his back, with the legs flexed, when a fullness will be noticed in the epigastrium, and, in the advanced stages, peristalsis can be readily seen, as may the pulsation of the abdominal aorta.

On deep inspiration, the tumor may be seen to descend an inch or two. Deep pressure reveals the presence of a hard, nodular mass in the epigastric region, if the growth involve the pylorus, or it may extend to the umbilical region, and sometimes is felt in the hypochondriac region. When confined to the cardiac orifice, the growth can not be determined by palpation. When the patient is very much emaciated, the indurated mass may be grasped between the fingers.

The disease may be complicated by secondary growths, especially that of the liver, when the patient becomes very much jaundiced.

Diagnosis.—The location of the growth renders the diagnosis easy or difficult. Thus, when the pylorus is involved, the

diagnosis is comparatively easy. The indurated mass can be readily felt through the abdominal walls; there is also dilatation due to the stricture. Add to these symptoms, pain, of a burning, gnawing character, various dyspeptic symptoms, frequent vomiting, especially the "coffee-ground" material, the presence of lactic acid after a test meal, and the continued absence of free hydrochloric acid, the lemon color of the skin, with great emaciation, render the diagnosis quite easy.

Where the growth is of the cardiac orifice, the tumor mass can not be felt by palpation, and should there be but slight loss of flesh and strength, as we sometimes observe, but little pain, and only occasional attacks of vomiting, the disease may not be recognized till near the end, and sometimes it takes a post-mortem to determine the true condition.

Prognosis.—This is unfavorable, few, if any, cases of genuine cancer recovering. The course of the disease is about two years, though some cases run their course in a few months.

Treatment.—It will be symptomatic, as different conditions arise, such as nausea and vomiting, hemorrhage, and pain. At the same time special attention should be paid to the diet. Such articles of food as are readily digested and assimilated in the intestines, should be used, and when obstruction of the pylorus occurs, predigested foods should be given, such as beef-peptonoids, and peptonized or pancreatinized milk-foods. When all nourishment is rejected, we will have to resort to rectal feeding. Much relief is afforded, in some cases, by lavage, while in others so much pain is occasioned by the process that we have to desist.

In the way of special remedies, hydrastin phosphate, echinacea, chelidonium, arsenicum, and like remedies, should be thoroughly tried. When the pain becomes too severe, we will have to resort to opiates, and render the sufferer as comfortable as possible.

HEMORRHAGE FROM THE STOMACH.

Synonyms.—Hematemesis; Gastorrhagia.

Etiology.—Hemorrhage from the stomach is a symptom, rather than a disease, and may arise from a variety of causes, some of which are outside of the organ entirely. The following are among the principal causes:

Mechanical.—Any injury either external or internal. Thus a penetrating wound, or a blow over the stomach, the unskillful use of a stomach-pump or tube, or the presence of hard, rough substances, which have been swallowed may give rise to hemorrhage. The taking of corrosive substances, such as acids or alkalies, acts in the same way, though perhaps they should be classed as chemical rather than mechanical.

Hemorrhage from the stomach sometimes occurs following a laparotomy, where the omentum has been injured.

Local diseases, such as cancer, peptic ulcer, or the ulceration accompanying chronic gastric catarrh; disease of the blood-vessels; such as fatty or amyloid changes of the gastric vessels, or varicose veins. And miliary aneurisms have produced fatal hemorrhages. Acute congestion as intense acute gastritis, and vicarious menstruation have, in rare cases, been considered exciting causes.

Passive Congestion.—Obstruction of the portal circulation, whether from cirrhosis of the liver, thrombosis of the portal vein, or pressure from tumors or adhesions, as well as chronic diseases of the heart and lungs may be exciting causes. Infectious diseases, by changing the character of the blood, as in typhoid, typhus, diphtheria, measles, smallpox, malaria, yellow-fever, etc., may give rise to hemorrhage.

External to the Stomach.—The blood may be swallowed, as often occurs in epistaxis, or hemoptysis, or in injuries of the pharynx and esophagus, or a nursing child may take considerable blood from a cracked and bleeding nipple, following which vomiting occurs, suggesting hemorrhage from the stomach.

Nervous Affections.—Progressive paralysis of the insane, hysteria, epilepsy, and tubercular meningitis, may give rise to hemorrhage, though the reason is not clear.

Of all the conditions that give rise to hemorrhage, cancer, peptic ulcer, and cirrhosis of the liver form the greater part.

Pathology.—As will be seen by studying the etiology of this condition, the pathology will be varied. When due to ulceration or cancer, the lesion is readily observed, but if the result of cirrhosis of the liver, the condition of the stomach remains unchanged, as it does in the more obscure cases.

If a fatal hemorrhage follows a miliary aneurism, it may open into the stomach by so small a perforation—pinhole—as to

be undiscovered, or the rupture of a submucous vein may leave so small an injury to the mucous membrane as to be readily overlooked.

Symptoms.—Those accompanying this condition are necessarily quite varied, the causes being many, and diverse. The hemorrhage may be so small that it is entirely digested, neither being vomited nor passed by stool. Again, the hemorrhage may be so copious as to result in sudden death before the blood is expelled from the stomach. Osler relates such a case, where the stomach contained between three and four pounds of blood after death.

When the hemorrhage persists for several days in succession, it is generally due to ulceration or cancer. Usually the blood is dark and clotted, being changed by the gastric secretions; where retained but for a short time, however, it is bright red. Where the blood is from the nose, and has been swallowed, it is usually dark, clotted, and offensive.

Frequently some blood passes into the intestines, and is passed at stool, a black, tarry mass. When the hemorrhage is copious, symptoms of anemia rapidly appear. If the hemorrhage be from the lungs, and has been retained some time, the blood will still be dark and clotted, but the oppressed respiration, and history of cough, will readily determine the source of the bleeding. When the hemorrhage is the result of the infectious fevers, and due to toxic conditions, the amount is usually small and dark in character.

Diagnosis.—Usually it is not very difficult to determine whence the blood comes. The previous history of the case will assist materially in determining this fact. We are not to forget that the vomitus may be stained by wine, the juice of berries, bile, and the use of certain drugs, notably iron and bismuth. Hysterical patients and malingerers have been known to swallow animal blood, which can only be determined by carefully studying the condition of the patient.

In hemoptysis, the blood is generally bright red and frothy, and is expelled by paroxysms of coughing, or, if swallowed, the cough gives rise to vomiting. Physical examination of the chest usually detects respiratory trouble, and the expectorated material is usually tinged with blood for a few days after the hemorrhage.

The salty taste of the blood, and the tickling sensation in the throat, usually attends hemoptysis and will assist in the diagnosis.

Prognosis.—Unless there be a rupture of an aneurism or a large vein in the walls of the stomach, the prognosis will be favorable, so far as life is concerned; even in cancer, the hemorrhage is rarely sufficient to cause death.

Treatment.—Absolute quiet should be enjoined, all unnecessary talking avoided, and the patient be required to assume the recumbent position. Small bits of ice may be given the patient, but fluids in considerable quantities should be withheld. If the hemorrhage be passive, and not alarming, *carbo-vegetabilis*, first trituration, in five-grain doses, may be given. Where the hemorrhage is active, gallic acid in five-grain doses will be preferable. Ergot hypodermically will be effective where it can not be retained by mouth. In some cases, small doses of ipecac act kindly, ten drops in half a glass of water, teaspoonful every thirty or sixty minutes.

Nourishment should be given in very small quantities, and in liquid form, for several days. The patient should be kept quiet and free from excitement. After the hemorrhage subsides, the after treatment will be symptomatic, treating the conditions as they arise.

GASTRALGIA.

Synonyms.—Gastrodynia; Cardialgia.

Definition.—A sudden intense pain, situated in the epigastric region, without sufficient gastric lesions to account for it, and due, no doubt, to irritation of the filaments of the gastric nerve.

Etiology.—The causes giving rise to gastralgia are numerous. In all cases, however, the pain follows either the direct or reflex irritation of the gastric filaments of the pneumogastric nerve. In some it is a secondary reflex, as where the irritation is at a distant part, as the reproductive apparatus, or rectal or urethral irritation. In locomotor ataxia we have an example of pneumogastric irritation followed by attacks of gastric pain. It may be due to local causes, as hypersecretion, or hyperacidity of hydrochloric acid. It may also be attributed to that vague condition, neuralgia, that is made to answer for so many unknown causes, or that equally abused condition, rheumatism.

The distinct periodicity manifested in some cases would suggest malaria as a cause, as it yields to antiperiodic treatment. The excessive use of tobacco and whisky may also be mentioned while coffee and tea drinkers often suffer in the same way. Deep grief, mental strain, or sudden and severe shock to the nervous system, also give rise to it. It is more frequently seen in nervous, hysterical women, especially about the menopause. Men, however, are not exempt.

Symptoms.—Although due to a variety of causes, the symptoms are quite uniform and characteristic. The attack comes on suddenly, the paroxysms lasting from a few minutes to an hour or more, and consists of a burning, lancinating, or boring pain in the epigastric region, passing through to the back and around the ribs; or it may extend upward over the sternal region, passing to the arms.

The attack may be preceded by anorexia, nausea, and vomiting, though usually not, for it is almost always independent of the taking of food. Eating, however, sometimes relieves the suffering. Firm pressure usually affords some relief, though deep pressure may add to the suffering. The attack passing off, the patient may seem no worse for the seizure, unless the paroxysm be of long duration and excruciating in character, when he seems greatly exhausted. The attack frequently terminates with eructations of gas, and rarely by vomiting.

Diagnosis.—The history of previous attacks, the absence of local disease, the sudden onset, and the paroxysm, render most cases easily diagnosed. The variety of causes that give rise to it, however, will render some cases more obscure, and require careful examination to reveal their character.

Prognosis.—This will depend entirely upon our ability in removing the cause. The disease of itself is not dangerous.

Treatment.—This will be twofold; first, to afford relief to the paroxysms of pain; second, to effect a cure by relieving the conditions which give rise to the lesion.

The first will be accomplished, where the suffering is agonizing, by a hypodermic injection of morphia, one-fourth grain, or chlorodyne, one teaspoonful to nine teaspoonfuls of water; of this a teaspoonful may be given every fifteen minutes till three doses are given, then at longer intervals, depending, of course,

upon the character of the pain. The old compound tincture of cajeput, in thirty-drop doses, is also very efficient. Where the pain extends to the abdomen, and there is tenderness on pressure, dioscorea will be the remedy.

Locally, a mustard-plaster over the seat of the pain answers a good purpose, though a few drops of chloroform on a cloth, and held over the affected part, will give much quicker relief; in fact, its effects are almost instantaneous.

Where there is gaseous distention, colocynth, ten drops; compound spirits of lavender, two drams; water, four ounces—a teaspoonful every five, ten, or twenty minutes—will soon start the patient to belching, which gives relief to the exquisite pain.

For a permanent cure, the case will need careful study, determining in each case the cause of the attack. If due to malaria, as will be seen by the distinct periodicity, quinia, gelsemium, arsenicum, etc., will be the treatment. If from menstrual derangements, cimicifuga, viburnum, and pulsatilla will be the better remedies. If due to stenosis of the uterine cervix, dilatation will afford relief; or if endometritis be present, a thorough curetting will either cure the gastralgia or place the patient in condition where medication will be beneficial. Of course, a lacerated cervix will need repairing, and a urethral stricture will have to be corrected, while hemorrhoids, pockets, fissures, papillæ, ulcers, and fistulas will need to be removed.

If the patient is of a rheumatic diathesis, we would give such remedies as bryonia, rhus tox., cimicifuga, apocynum, phytolacca, and rhamnus californica, as symptoms calling for these various remedies would indicate. Thus muscular soreness would suggest cimicifuga; sharp lancinating pain, bryonia; sharp stroke of pulse, with irritability, rhus tox.; edema of eyelids or puffiness of feet, apocynum; while rhamnus californica will be useful where constipation is marked.

Some patients will need to be placed on a spare diet, while others will be compelled to abstain from tea and coffee. Tobacco and whisky will have to be given up, if the gastralgia be due to this cause. Galvanism is of marked benefit in some cases, the positive pole being placed over the epigastrium, while the negative pole is over the lumbar spine.

NEUROSES OF THE STOMACH.

Synonyms.—Nervous Dyspepsia ; Gastric Neurasthenia.

Definition.—A functional disturbance of the stomach, in which there is no organic lesion sufficient to account for the gastric derangement. There is more or less distress after eating, which may, or may not, affect digestion.

Etiology.—There are quite a variety of causes giving rise to this condition. It occurs more frequently in the more "well-to-do" classes, and may follow sexual or social excesses. Great mental excitement, worry over business or family affairs, grief not easily assuaged, and prolonged melancholy, should be considered as causal factors.

Many times it is reflex, and the cause must be sought in the irritation of the sympathetic at some point distant from the stomach. Thus ovarian irritation, laceration of the cervix uteri, and endometritis, or hemorrhoids, fissures, rectal pockets, fistulæ, and papillæ. Sometimes the urethra is the seat of the disturbance, and a stricture or a caruncle is teasing the terminal fibers. Hysterical and neurasthenic patients are frequently troubled with nervous dyspepsia.

There may be hypersecretion of the gastric juice, or undue acidity, and at times we find a defect in the quantity, any one of which will give rise to the disorder. Underlying all of the causes, however, is undoubtedly a nervous temperament.

Pathology.—After repeated examinations of the stomach, there will be failure to find structural lesions, and many times the pathological wrongs will be found at a distant part, as the uterus, rectum, or urethra.

Symptoms.—The symptoms of nervous dyspepsia are legion, and a nervous subject complains of nearly every symptom to which flesh is heir. We see patients that are very much emaciated, while others are full-fleshed, and appear the picture of health, and between these, there is every grade of diseased condition.

The most common symptoms are, a sense of fullness and weight, accompanied by pain of a burning, gnawing character, shortly after taking food. At times there is great distention of the stomach, and the patient is compelled to hurry to her room and loosen dress, corset, and everything which presses upon the stomach ; finally, loud and frequent eructations of gas afford re-

lief, leaving the stomach, however, quite painful on pressure. Or the gas may pass into the bowels, followed by borborygmus, a condition embarrassing, though not painful.

Where there is hyperacidity and hypersecretion, the patient experiences a burning sensation in from one to three hours after a meal, attended by eructations of sour fluid, and finally vomiting ensues, giving entire relief to all distress. Spasm of the cardiac orifice is attended by severe pain, at times simulating angina, and frightening both patient and friends, who fear a fatal termination to the attack.

Constipation is usually present, with more or less flatulent distention of the intestines, and frequently there is abdominal pain. Headache, malaise, sleeplessness, and melancholy are commonly present.

Diagnosis.—In the diagnosis of this disease many difficulties present themselves, and many times the symptoms are so similar to those of organic disease of the stomach that great care is required to differentiate between them. If we bear in mind the etiology of this condition, it will aid materially in recognizing the lesion.

The nervous temperament, the history of the case, the normal time in digesting the food, notwithstanding the pain and discomfort, and, finally, examining the contents of the stomach after a test meal, are sufficient to make the case clear. If the local symptoms are insufficient for a diagnosis, do not fail to examine the rectum and genito-urinary apparatus.

Prognosis.—In a large percentage of cases a cure should be effected. It is important to impress a nervous patient that a cure will ensue, if complete instructions are followed; then persevere till the cause of the disease is located, and a cure will soon follow.

Treatment.—A very careful examination should be made to determine the producing or continuing cause. Is it due to errors in digestion, to mental worry or overwork, to sexual excesses, to late hours and dissipation in general; if so, they must be corrected. Above all, do not fail to determine if the terminal fibers of the sympathetic are being teased by wrongs of the genito-urinary system. By correcting these wrongs as they appear, a cure is soon effected.

One of the worst cases of nervous dyspepsia it has ever been

my lot to treat, was due to endometritis and rectal troubles. She had suffered for two years, and had been treated by a number of reputable physicians, who, strange to say, had overlooked the reproductive apparatus. She had been placed upon a rigid diet, had heroic medication, and also infinitesimal doses, but all to no purpose.

An examination revealed a uterine leucorrhea, due to endometritis and a bad rectum. A thorough curetting, and some rectal work, gave the patient the first genuine relief she had experienced, and the case made an uneventful recovery.

Some patients need to be restricted in their diet, while others may be allowed a generous but nutritious bill of fare. As a rule, *fried* and *greasy* articles should be prohibited; also *sweets* and *starchy* foods. Tea, coffee, milk, and water should be restricted, the patient living on a dry diet.

To encourage digestion, and add tone to the stomach, give nux and hydrastin. To overcome constipation, have the patient massage the abdomen before rising in the morning, drink a glass of cold water, and go to stool at a regular hour. To encourage the bowels, a half dram of cascara evacuant may be given for a few days, till the bowels assume their normal condition. Spasm of the cardia or pylorus will be benefited by the following prescription:

R Colocynthgtt. viii.
Compound Spirits of Lavender.....℥ii.
Water℥iv. M.
Sig. Teaspoonful every ten, twenty, thirty,
or sixty minutes.

For the burning, bismuth subnitrate in mint-water answers an excellent purpose.

Some very stubborn cases, where melancholy is a prominent symptom, will improve rapidly by a change of air, scenery, and surroundings, thus getting the patient away from self and interested in what is going on in the world. A sea-voyage, a mountain journey, or a visit to the country, will thus accomplish what drugs fail to do.

HYPERSECRETION AND HYPERACIDITY.

Definition.—Increased activity of the secreting apparatus of the stomach, whereby an undue amount of hydrochloric acid, more than is required for the purpose of digestion, is secreted.

Etiology.—Hyperacidity, or increased secretion, usually occurs from one to three hours after taking food, and may be due to some of the causes already mentioned under nervous dyspepsia; namely, grief, melancholy, prolonged and severe mental exertion, financial or family troubles, or to reflex disturbances, occasioned by irritation at some of the orifices of the body. Dissipation, late suppers, excessive use of tobacco, alcohol, and tea and coffee, may also figure as causative factors.

Symptoms.—One or two hours after taking food the patient experiences a burning, scalding, or gnawing sensation in the stomach, accompanied by eructations of a sour, acrid fluid, and, as the patient expresses it, it seems to scald the throat and put the teeth on edge. If large quantities of fluid have been taken with the food, vomiting may ensue.

The hypersecretion of acid delays digestion, if much starchy food has been taken; in which case the pain is of longer duration. Albuminoids, on the other hand, are rapidly digested. With this condition is usually associated more or less headache, malaise, and dizziness or vertigo. There is frequently tenderness on pressure over the epigastrium.

Diagnosis.—The symptoms already given are usually sufficient for a diagnosis, though a positive knowledge is only determined by a repeated analysis of the gastric contents. This is made, one hour after partaking of a test breakfast, consisting of a roll and cup of tea, without milk or sugar. Free hydrochloric acid is greatly increased, if hyperacidity is present.

Prognosis.—This is always favorable in recent cases, though, in old chronic sufferers, the disease is often quite stubborn.

Treatment.—The diet should deserve first attention, and should consist principally of albuminous foods. Lean meats, eggs, milk, and whole-wheat bread should be the principal bill of fare. Acid fruits should be restricted, and also spirits in all forms, as they tend to excite the secreting glands. With the exception of milk, the patient does better on a dry diet.

Where the hyperacidity is excessive, a daily washing out of the stomach with a weak solution of sodium bicarbonate or boracic acid will prove beneficial. Full doses of sodium bicarbonate, one or two hours after each meal, will prove useful in neutralizing the excessive acidity.

Bismuth subnitrate in mint-water is also beneficial. Phosphate of hydrastin, grs. v; nux vomica, gtt. ii; water four ounces; a teaspoonful every three hours, will improve the tone of the stomach, and thus aid in the cure. Rhus tox., where the patient is very nervous and inclined to vomit, is a good remedy. Berberis aquifolium in five-drop doses, every three hours, will also give good results.

NERVOUS VOMITING.

This condition frequently occurs without any anatomical lesion of the stomach to account for it. It is reflex in its origin, and most frequently occurs in hysterical women, although there are notable exceptions. Thus seasickness, attended by vomiting, is experienced by the great majority of both men and women who take an ocean voyage. Sick headache is a very common example, while the vomiting of pregnancy is reflex in character.

Organic lesion of other organs is frequently attended by vomiting, as is seen in Bright's disease, organic diseases of the liver, spleen, or of the nervous system. Gall-stones and renal calculi may be attended by vomiting, while irritation of the rectum, uterus, urethra, or vagina may result in this unpleasant condition. Neurasthenic and hysterical patients are notable examples of this condition.

The symptoms of this form of vomiting differ somewhat from those that usually occur in lesions of the stomach.

The food is usually ejected without much effort, and nausea is not often present. In some cases, only certain articles of food are vomited, while in others the diet seems to make but little difference. In hysterical patients, there is usually but slight disturbance of nutrition, but where organic diseases of other parts are the cause, unless corrected, death may result.

Treatment consists in determining the exciting cause, and removing it where possible, when the vomiting ceases.

RUMINATION.

Rumination or merycism is a peculiar neurosis, in which the patient regurgitates and masticates, or "chews his cud" like ruminants. It occurs among hysterical patients, epileptics, and in the feeble-minded. While it rarely affects the patient's health, it is a disgusting habit, and where the patient is mentally capable of being reasoned with, he should be impressed with the disgust with which society views the habit. The treatment, therefore, will be chiefly mental.

PERISTALTIC UNREST.

Peristaltic unrest was first described by Kussmaul, and consists of increased peristalsis, which is attended by a gurgling sound, and often visible, as waves passing from left to right. The general health is not impaired; embarrassment to the victim is the only result. The treatment, as in most neuroses, consists in finding out and removing the exciting cause. Electricity sometimes proves beneficial.

NERVOUS ERUCTATIONS.

This form of gastric neurosis is attended by attacks of noisy eructations, independent of fermentative changes, in the stomach. The attack may last for several hours or a few days, and occurs in hysterical patients. The expelled gas is usually atmospheric air, and is odorless and tasteless. The patient may acquire the habit, and become so expert as to avoid detection. Sometimes it is due to spasm of the pharynx, which causes involuntary swelling. The treatment is similar to other neuroses of the stomach, and consists in overcoming the exciting cause.

VII. DISEASES OF THE INTESTINES.

ACUTE CATARRHAL ENTERITIS.

Synonyms.—Acute Intestinal Catarrh; Acute Diarrhea; Enterocolitis.

Definition.—An acute catarrhal inflammation of all, or a part of the intestinal tract, and characterized by frequent mucous diarrheal stools.

Etiology.—There are certain predisposing causes that should

be taken into consideration ; viz., age, season, previous attacks, and individual susceptibility.

Age.—While no age is exempt, children under two years of age suffer from catarrhal enteritis more than those in any other period of life.

Season.—The hot season, or the months of July, August, and September, will witness the most cases.

Previous Attacks.—Previous attacks render the patient far more liable to the disease.

Individual Susceptibility.—Some individuals, who are otherwise perfectly healthy, suffer from frequent attacks of diarrhea.

Other conditions, such as an enfeebled vitality, insufficient clothing, confinement within doors without proper exercise, may be considered as predisposing to this disease.

The Exciting Cause may be divided into primary and secondary.

Primary.—Irritation is the primary cause of an attack, and may arise from food, changed secretions, acid or alkaline, drugs, or from infection. The most common, especially in children, is improper food, unripe fruit being peculiarly irritating. Green food stuffs not properly prepared, or insufficiently cooked, are very common causes during the hot summer months.

Over-eating, even though the food be of good quality and properly prepared, may also give rise to diarrhea. Pure water, or water to which the patient is not accustomed, may also be the causal factor. Toxic substances in the form of ptomains, produced in cheese, milk, canned goods, or from the ingestion of certain drugs, such as arsenic, mercury, antimony, and the mineral acids and alkalies, may give rise to diarrhea. Even harsh cathartics may act in the same way.

Sudden atmospheric changes, especially from hot to cold, when the individual has insufficient clothing, may produce the disease, while a change in the intestinal secretions, either an excessive or perverted secretion, will give rise to diarrhea. Mental excitation, such as a great shock, or severe fright, will also act as the excitant.

Secondary.—Infectious diseases, such as typhoid fever, tuberculosis, dysentery, cholera, measles, pneumonia, septicemia, and pyemia are preceded or attended by diarrhea. The extension of the inflammatory process from adjacent parts, such as gastritis,

peritonitis, hepatitis, intestinal ulcer, hernia, invagination; certain cachectic diseases, as cancer, Bright's disease, anemia, syphilis, etc.; circulatory disturbance, especially congestion of the portal circulation.

Pathology.—The pathological changes are similar to those of all mucous surfaces, viz: Engorgement by an excessive exudation of mucus. The membrane is red and swollen, though when the inflammatory process is long continued, the redness subsides and the mucous membrane becomes soft and pale. The solitary and agminate glands become enlarged and stand out prominently; the centers of the follicles undergo necrosis, giving rise to follicular ulcers. The mesenteric glands are usually swollen and hyperemic.

Symptoms.—The symptoms depend somewhat upon the seat of the inflammation, whether a part, or the whole of the intestine be involved. Diarrhea is the most characteristic symptom and is very early attended with pain, usually of a griping character. If the colon be much involved there will be a more constant desire to go to stool, and there will be tenesmus, similar to dysentery.

The stools vary from two or three to twenty or thirty in twenty-four hours. They may be small, and mostly mucus, or large, watery, and feculent, the color depending largely upon the amount of bile present. Mucus with specks of blood is often seen in the stool, and sometimes undigested food.

There is usually more or less rumbling of the bowels, especially where the small intestine is the seat of the disease, and is due to increased peristalsis. The tongue is generally elongated and red at tip and edges, there is marked thirst, the skin is dry and hot, and the temperature slightly elevated. In children there may be nausea and vomiting, and in nervous children, a convulsion is not uncommon. In delicate children and old people, there is danger of collapse, the skin becoming relaxed, cold, and clammy.

Diagnosis.—There is usually but little difficulty in recognizing this disease. Sometimes it may resemble typhoid fever, but the peculiar temperature curve, the enlarged spleen, and the characteristic eruption of the latter, will enable one to note the difference between the two. It is distinguished from dysentery by the severe tenesmus of the latter, together with a mucous, or mucobloody stool.

Prognosis.—Unless severe complications arise, the prognosis should be favorable.

Treatment.—The management and care of the patient is of great importance, and must be rigidly followed to get the best results from medication; in fact, the best treatment may be rendered void by neglect in this line. The patient should be placed in bed and required to remain quiet, not allowing him to get out of bed to stool, as the exertion brings on increased peristalsis; for this reason a bed-pan should be used. The patient should be encouraged to resist the call to stool just as long as possible.

The diet should consist of milk taken in small quantities, or whey or junket may replace the milk, which usually is received kindly. Malted milk is also borne well, and strained chicken or lamb broth may be given after the acute stage is passed.

During convalescence, scraped beef, well-cooked rice, and fresh, ripe fruit may be cautiously given, withdrawing at once any article that causes irritation. During the acute stage the patient is very thirsty, and calls almost constantly for water; the gratification of his thirst, however, increases the irritation and aggravates the disease. Small bits of cracked ice or albumin water, in small quantities, may be allowed, or, what is better still, a teaspoonful of white liquid physic in a fourth of a glass of water; this acts kindly to the inflamed bowel, and at the same time checks the thirst.

In the use of remedies, *do not give* castor-oil or salines, unless you are thoroughly convinced that there are accumulations of fecal matter that are a source of irritation. Where the tongue is elongated and red at tip and edges, give,—

℞ Aconitegtt. v.
 Ipecacgtt. x.
 Waterʒiv. M.
 Sig. Teaspoonful every hour.

Many of the old Eclectics are still wedded to the old neutralizing cordial, which is certainly a grand prescription.

Where the tongue is red and moist, the following prescription will give good results:

℞ Magnesium Sulphate.....grs. x-xx.
 Waterʒiv. M.
 Sig. Teaspoonful every hour.

Where there is nausea, bismuth and mint-water will be indicated.

When there is griping pain and much flatus, colocynth is one of our best remedies.

When the tongue is broad, skin relaxed, and pain points to the umbilical region, use,—

℞ Nux Vomica.....gtt. v.
Waterʒiv. M.
Sig. A teaspoonful every hour.

Where the stools are watery, and green in color, give arsenite of copper 2x, half as much as will lie on a dime, every one or two hours.

Where there is nervous irritation, with nausea, the prescription will be,—

℞ Rhus Tox.....gtt. x.
Waterʒiv. M.

This is one of our best agents.

If the tongue be full and coated, podophyllin 2x, grs. ii, every two or three hours, will give good results.

Dioscorea.—Where there is marked tenderness on pressure, or the patient complains of constant soreness, use,—

℞ Dioscoreagtt. x-xxx.
Waterʒiv. M.

Sig. A teaspoonful every one, two, or three hours.

Local Measures.—Where the stools are frequent and acrid, flushing out the bowel is of great benefit. We may use simple sterilized water, or a weak saline solution; allow the stream to flow till the water returns perfectly clean. Should the pain be intense, a tablespoonful of starch-water, to which has been added from five to twenty-five drops of laudanum, should be thrown into the rectum. A liniment of camphor, turpentine, aa. ʒi; alcohol, ʒii, may be used to gently rub over the abdomen every three or four hours.

CHRONIC CATARRHAL ENTERITIS.

Synonyms.—Chronic Intestinal Catarrh; Chronic Enterocolitis; Chronic Diarrhea.

Definition.—A chronic inflammation of all, or a part, of the intestine.

Etiology.—Repeated attacks of acute enteritis, the patient resuming his duties before a complete cure is effected, may be responsible for the disease. Long-continued exposure, with improper food, is perhaps the most common cause; thus we find chronic diarrhea one of the most common diseases of soldier life, and quite a large per cent of the pensions that are to-day being drawn by veterans are due to chronic diarrhea.

The long-continued use or abuse of cathartics may also irritate, and finally impair, the tone of the bowel, so as to give rise to chronic inflammation. Chronic congestion of the portal circulation due to structural change of the liver, or chronic enlargement of the spleen, is often accompanied by diarrhea. Tuberculosis, as well as cancer of the intestine, gives rise to the same condition.

Pathology.—In the earlier stages the changes are similar to those of the acute form; but later, the mucosa assumes a slaty hue, with deep pigmentation in the tips of the villi and around the solitary glands. This gives the mucous membrane the "shaven beard" appearance. The mucous membrane is very much thickened in patches, and at other portions it is very thin, giving it an irregular, sacculated appearance. Some portions are so thickened as to amount to stricture.

In children and old people, there is more apt to be atrophy of the mucous membrane, attended by marked thinning of the walls and great dilatation. As the disease progresses, ulcers form in the lymphatic follicles; these are one-eighth to one-fourth of an inch in diameter, and, where several coalesce, give rise to large, irregular-shaped ulcers, that penetrate the muscular coats; and sometimes the entire intestine.

The ulcers are more frequently found in the descending colon, the sigmoid flexure, and the rectum. In severe cases the bowel is honeycombed with these ulcers. The entire mucous surface is bathed with a dirty, tenacious mucus or muco-pus. As a result of the inflammatory process, adhesions of their peritoneal surfaces often take place.

Symptoms.—Diarrhea is the most pronounced feature, though it varies greatly; thus there may be one copious watery evacuation early in the morning, the bowels remaining in a quiescent state the remaining twenty-four hours; or there may be eight or

ten stools per day; or the average daily stools may be three or four in number, but increased if any unusual diet be taken. Each stool is generally preceded by griping pains and severe tenesmus, if the lower bowel be the seat of the disease. There is tenderness in the course of the inflamed tract, and if ulceration be present, deep pressure reveals marked soreness.

The stools are preceded or accompanied by borborygmus. In color they may be of any shade, though usually dark and offensive, and consist of mucus, shreds of mucous membrane, pus, and fecal matter; sometimes more or less blood is present.

Where the stools are frequent, they are usually small in quantity. The general health depends, to a great extent, upon the severity of the case. Where but one or two stools occur each twenty-four hours, the strength of the patient is but little impaired; but where they are frequent, the patient soon loses flesh and strength; the skin becomes dry and harsh, the tongue is coated with a dirty pasty coating, the breath more or less fetid, and a slight fever may attend, at a late stage of the disease. There is generally melancholy, and life appears as one continual drag.

As the disease progresses, the patient becomes emaciated, the feet become puffy, and, where there is hepatic complications, anasarca develops. The skin now becomes yellow, the pulse feeble, the tongue red and dry, night-sweats occasionally occur, and the patient dies from exhaustion; or typhoid symptoms develop, the patient dying of sepsis.

Diagnosis.—This is usually readily made; the presence of diarrhea, attended by pain, more or less flatulency, tenderness on pressure, the character of the stool—all tend to confirm the diagnosis.

Prognosis.—This depends to a great extent upon the stage of the disease. Where of long standing, and where there is much structural change in delicate and impoverished children and in the aged, there can be but little encouragement given. The earlier the treatment, the more favorable the prognosis.

Treatment.—A strict adherence to a dry diet is one of the essentials of a cure; in fact, more can be accomplished by this than from medication, and unless a patient will agree to a strict observance of these rules, the physician should refuse to take the case.

Tea, coffee, milk, and water should be restricted at meal-time and for two hours after. A sandwich composed of thin, stale bread and scraped beef for breakfast, bread slightly spread with butter and dusted with malted milk for dinner, and a cup of hot malted milk for supper, will do for severe cases, while a somewhat more generous diet may be allowed in milder cases. A *small* piece of *broiled* tenderloin and bread, or a soft-boiled egg, may be allowed. Some may eat well-cooked rice or wheat-germ meal. Ice-cream in small quantities may be allowed.

As the patient is very liable to frequent relapses, he should discard coffee, tea, water at meal-time, for at least six months after he is discharged as cured, and some cases need total abstinence throughout life. Starchy, fatty, and sweet articles should be avoided. To add tone to the digestive apparatus, give,—

℞ Nux Vomica.....gtt. v.
Hydrastin Phosphate.....grs. iii to v.
Water℥iv. M.
Sig. A teaspoonful every four hours; this will
give good results.

Where the mucous membrane is feeble and relaxed, the stools frequent and watery, the following prescription will do good service:

℞ Tinct. Geraneum.....℥i to ii.
Water℥iv. M.

Or five-grain doses of bismuth subgallate may be given for a day or two, but should not be continued for any length of time.

Epilobium has been successfully used by our school, but should be used for a long time to get the best results.

Where pain is of a spasmodic and colicky character, colocyath will be the remedy.

Where the coating of the tongue is lifted in spots, and the stools are foamy, charcoal will be a good agent, five grains of the first or second trituration, after each meal.

Where there is ulceration, flushing the bowel with a solution of boracic acid will be highly beneficial and where there is catarrh of the sigmoid I have obtained good results by introducing through a sigmoid speculum, a pledget of cotton well covered with balsam of Peru; this is allowed to remain till removed by the

patient going to stool. This may be applied, two, three, or four times a week.

The patient should take gentle exercise, daily, in the open air; but severe exertion should be avoided.

PHLEGMONOUS ENTERITIS.

Suppurative inflammation of the submucous layer of the intestines is a very rare disease, and can seldom be diagnosed during life. It is seen in connection with strangulated hernia, intussusception, and obstruction of the bowel. The symptoms resemble those of peritonitis, there being abdominal distention, marked tenderness on pressure, intense tenesmus, and violent attacks of vomiting, which may become stercoraceous.

Rigors may occur, and the prostration is rapid and extreme. The temperature is high, 104° or 105° , the pulse small and wiry, and the tongue dry and red. Typhoid symptoms are now marked, and the patient passes from the stage of prostration to one of collapse or death.

Diagnosis.—This is made post-mortem.

Treatment.—It will be palliative, relieving the patient's suffering as far as possible. In operative cases a surgeon should be called, and this followed by supportive measures.

PSEUDO-MEMBRANOUS ENTERITIS.

Synonyms.—Croupous Enteritis; Diphtheretic Enteritis.

Definition.—An intense inflammation of the mucous membrane of both the small and large intestine, and characterized by a croupous exudate.

Etiology.—Several factors may give rise to this form of diseased condition. It may follow or accompany certain infectious diseases, such as pneumonia, typhoid fever, scarlet fever, pyemia, and kindred diseases. It may also accompany certain chronic cachectic diseases, such as cancer of the liver and Bright's disease; while the ingestion of certain drugs, mercury, arsenic, ammonia, lead, and certain acids, may be responsible for the disease.

Pathology.—The morbid changes that take place are two-fold; the one affecting the mucosa in the ileum and colon, the other the solitary follicles.

In the first, an exudate of varying thickness and of a grayish white or grayish yellow color, is seen upon a deeply congested base.

In the second, the exudate is found around the opening of the follicles, in the center of which ulceration may be seen; in some the solitary glands are prominent and capped by the exudate.

Symptoms.—These are not characteristic, and the disease may only be discovered after death. When due to chemical irritants, there is generally severe vomiting and purging, the stools being mixed with more or less bloody mucus. If the result of any of the infectious diseases, there is usually pain and diarrhea and occasionally some of the exudate is seen in the stool.

Treatment.—This will be symptomatic. There will be sufficient evidence of sepsis to justify us in selecting the proper antiseptic. Echinacea will be thought of on general principles, though duskiness of tissue would be the most striking symptom. Potassium chlorate and hydrastin would be called for when there were offensive odors from breath and stool. Phytolacca will be used for glandular enlargement.

MUCOUS COLITIS.

Synonyms.—Tubular Diarrhea; Membranous Enteritis.

Definition.—A chronic disease of the colon, characterized by the formation of masses or plugs of mucus, which are voided in strings, shreds, or in tubular form.

Etiology.—The definite cause is not known. It most frequently occurs in women of nervous temperament and hysterically inclined, and in neurasthenic males. It is often found in connection with other rectal troubles, such as hemorrhoids, pockets, papilla, and hypertrophy of the rectal mucosa and prolapsus of the bowel. It is occasionally found in delicate children with prolapsus of the bowel.

Pathology.—The pathological changes are not very marked and can not be said to be characteristic. There may be seen

localized catarrhal areas, and the sigmoid and the rectum may be relaxed, of a purplish hue and bathed in tenacious mucus. It may possibly be due to irritation of the sympathetic system of nerves, for the correction of rectal irritation and urethral and uterine disorders is invariably followed by an improved condition of the entire intestinal tract.

Symptoms.—The mucus may be passed daily, though usually it occurs in paroxysms at intervals of three or four weeks. Each attack is usually marked by pain, tenesmus, and more or less nervous excitement. An attack may last for several days, when there is an interval of rest for a few weeks. The passing of the mucus gives some relief to the pain. Any undue or prolonged excitement brings on an attack.

Diagnosis.—This is readily recognized by the character of the stool.

Prognosis.—The disease is chronic in character, and requires not only treatment for the colon, but also to improve the nervous condition of the patient. They are usually very unsatisfactory patients to treat, though there is little danger to life. When the causes can be removed the prognosis should be favorable.

Treatment.—A thorough examination should be made of the rectum and reproductive apparatus, and any wrongs that are found, corrected. Sometimes colonic flushing with water, medicated to suit the case, will give very good results. Where there is catarrh of the sigmoid, and there usually is in these cases, the local application of balsam of Peru, as mentioned in treatment for chronic enteritis, will be highly beneficial. The diet of the patient should be carefully selected, avoiding such articles of food as experience has proved harmful.

All sources of irritation to the mind and body should be avoided. Change of one's surroundings is often far more beneficial than medication. *Nux vomica* and *hydrastin* is a good tonic, and should be given three times a day. *Potassium bichromate*, 2x, in three-grain doses, will do much to overcome the excessive secretion of mucus. *Agrimony* one dram, to water four ounces, a teaspoonful every three hours, will benefit some cases. When an attack comes on, the patient should be put to bed and all excitement avoided.

DIARRHEAS OF CHILDREN.

Synonyms.—Acute Gastro-intestinal Catarrh; Summer Complaint; Acute Gastro-enteritis; Cholera Infantum.

Definition.—In nearly all the infantile diarrheas, there is an involvement or irritation of the stomach as well, and frequently they occur in epidemic form. Especially is this true of cholera infantum. It may accompany an attack of indigestion, the patient being free of fever, or an attack may be attended by high temperature, great excitation of the nervous system, and extreme prostration.

The summer diarrheas are usually divided into three varieties: (1) Acute dyspeptic diarrhea; (2) cholera infantum, or summer complaint; (3) ileo-colitis.

Etiology.—The greatest number of cases occur between the age of six and eighteen months, and are confined almost entirely to bottle-fed babies. According to Holt's Statistics, only *three per cent*, out of two thousand cases examined, occurred in children that were entirely breast-fed. While no class is exempt, the poor are the greatest sufferers. The second summer is commonly regarded as the most trying period in an infant's life, owing to the substitution of solids for fluids, and the eruption of teeth.

The most important causal factors in enteritis in children, are diet and temperature. Most artificial infant foods are rich in starch and sugar, and readily ferment in hot weather; this is especially true where the nursing-bottle and nipple are not kept *absolutely* sweet and clean. Neglect on the part of the poorer classes to this *one* important matter accounts largely for the great mortality among this class of patients. The disease may begin as early as May, progressively increasing until July, when it reaches the maximum; then gradually declines till August or September.

Booker has isolated forty varieties of bacteria, found in the stools, and probably each or all possess some pathogenic properties, and, when found in milk, may produce important changes, detrimental to digestion.

Pathology.—The mucous membrane of the large and small intestine generally shows catarrhal inflammation, and when the disease assumes a chronic form, follicular ulceration is not un-

common. A fibrinous exudate (Croupous Enteritis), a rare condition, affects the lower part of the ileum and colon. As a result of the diffuse watery diarrhea, the liquid parts of the blood are decreased, anemia being quite marked. Not infrequently the spleen is enlarged.

Clinical Forms.—*Acute Dyspeptic Diarrhea.*—The disease may come on gradually, the general health not being much affected for a few days, though the stools are quite frequent, and consist of curds, undigested food, feces, and gas, *offensive* in character and of a greenish or yellowish-green color. The child soon becomes peevish and restless at night. At other times the attack comes on suddenly, with vomiting, colicky, griping pains, and a fever which rapidly attains a temperature of 104° or 105° . Not infrequently in nervous children, the disease is ushered in with a convulsion.

The abdomen becomes distended, is sensitive, and the child flexes the limbs on the abdomen for relief. If bottle-fed, the stools contain greenish curds, gas, and feces. If older, unripe fruit is apt to form an important part of the stools. If not arrested, it may terminate in cholera infantum or ileo-colitis.

In dyspeptic diarrhea, the pain is *griping* in character, and the abdomen is *distended*, while in cholera infantum the stools are *watery* in character, and the abdomen is apt to be flat or collapsed; and in ileo-colitis the pain is *tenesmic*, and the stools contain mucus or mucus and blood.

Cholera Infantum.—The disease may be preceded for twenty-four or forty-eight hours by diarrhea, the stools being loose and fecal in character, and very offensive. Soon, however, the child becomes thirsty, greedily taking anything of a fluid character, and cries and frets constantly for water, crying for it when brought in its presence. Fluids, however, are rejected as soon as swallowed. The stools now become frequent, are large and watery, losing their fecal character and odor, the napkin often being stained a green or brown color, but devoid of feces.

The prostration is rapid and extreme, and the plump, rosy child can scarcely be recognized in twenty-four or forty-eight hours after an attack. At first the skin is dry and harsh, the pulse small and rapid, and the child is restless, and can not be kept quiet in bed, but must be changed almost constantly. The temperature runs very high, ranging from 103° to 108° .

Cerebral complications are first noticed by the child rolling the head from side to side. The head now becomes hot, the face flushed, the child cries and frets constantly, or, if it drops asleep, the eyes are only partly closed, and the child is soon awakened by a sharp cry.

As a result of the frequent watery stools, the abdomen becomes *flat*, the eye is sunken, the nose pinched, and the tissues inelastic, and the stage of collapse is ushered in. The extremities now become cold; the nose, lips, and ears become blue, vomiting ceases, the stools lessen in frequency, the pulse is small and thready, the child passing into a comatose state, and death soon terminates the case; or reaction takes place, the pulse becomes stronger, the body regains its warmth, and the child enters the convalescent stage.

The disease may run a very rapid and fatal course, death occurring within twenty-four or forty-eight hours; or it may be prolonged three or four days, each additional day of life adding to the patient's chance of recovery.

Ileo-colitis.—This is the dysentery of childhood, the symptoms depending upon the extent and location of the inflammation; thus, when the ileum is the chief seat of the inflammation, the stools will contain fecal matter, while mucus and blood compose the stool, if the colon receive the force of the attack. Generally, however, both are involved, and the stools at first are composed of feces, undigested food, and mucus. An attack may follow acute dyspeptic diarrhea, or it may develop suddenly.

Fever early develops, the temperature ranging from 102° to 104° , the pulse small and frequent, the skin hot and dry, urine scanty and high-colored, and nausea and vomiting frequently attend. The stools are greenish, and for forty-eight or seventy-two hours contain fecal matter; but as the disease progresses, they are composed of mucus and blood, and in some cases blood alone.

The stools are attended with griping, colicky pains, the tenesmus often resulting in prolapsus of the bowel. The abdomen is *distended*, and there is pain and tenderness along the course of the colon. The stools vary in number, from two or three to thirty per day. If not early relieved, the child rapidly loses flesh and strength, the face becomes pinched and haggard, and the child may die from exhaustion.

Treatment.—The treatment of the various forms of summer complaints may be divided into hygienic, dietetic, and medicinal.

Hygienic.—The laity as well as the profession, are beginning to realize as never before the necessity of fresh air, not only in the treatment, but also in the prevention of the disease, and cities vie with each other in providing park facilities, playgrounds, and fresh-air funds for the overcrowded portions of our great cities. Fresh air is absolutely necessary to the life of these little patients, and, when it is at all possible, they should be kept much in the open air. Among the more favored classes a trip to the seashore or mountains works wonders in a very short time.

Bathing is beneficial, not only in insuring cleanliness, but also in carrying off excessive heat. The *soda* bath will prove of great benefit, the child being sponged off every few hours when the temperature range is high. Especially beneficial is sponging the head with *hot* water when there is determination of blood to the brain, as manifested by rolling of the head.

The clothing should be as light and loose as possible, and during the heat of the day should consist of only a slip and napkin, changing to flannel during the night, if the night-air becomes cool.

Dietetic.—Since errors in diet are responsible for a very large per cent of summer diarrheas, the dietetic treatment will at once be recognized as one of vast importance; and we are not to forget that digestion is arrested in nearly all these cases, and that nourishment is to be given only in the blandest form and in very *small* quantities at a time.

Since over ninety per cent of summer diarrheas occur among bottle-fed children, our first attention will be turned to the bottle and the nipple. Every artificially fed baby should be furnished with at *least* two nursing-bottles, and several *maroon* or *black nipples*, and a crock of soda-water, in which to place the bottle after each feeding.

Never allow a *nursing-tube* to be used in a bottle, as it is almost impossible to keep it sweet and clean in hot weather. After each feeding, the bottle should be thoroughly rinsed with hot water, and placed in soda or lime water until the next feeding, the nipple thoroughly turned and rinsed, and placed in cool, sterilized water. The food should be prepared *fresh* for each feeding, or else kept in a sterilized bottle in a refrigerator, and heated at each feeding.

In the selection of the food much depends upon the condition of the stomach. Some will not tolerate milk in any form, and small quantities of albumin or rice-water or toast-water will be the only nourishment retained. Others will do nicely on cow's milk diluted with barley-water; this is a favorite with me, and, when it can be taken, receives first choice,—three parts milk and one part barley-water. Sherry or pepsin whey is another favorite food.

However, there is no food that will agree with all patients; in fact, we might say that each patient needs a special study as to foods, and Horlick's malted milk, Mellin's food, Carnrick's lacta preparata, Fairchild's peptogenetic milk, and Eskay's foods are the most likely to meet with favor; but whatever food is selected, it *must* be given fresh each time and in small quantities.

Water.—Pure water may be given freely to cleanse the stomach; especially in cholera infantum, will we find great irritation of the stomach, and even a teaspoonful of water will be rejected. In such cases it is well to allow the patient to drink several ounces, and in this way wash out the stomach. The bowels may also be irrigated or flushed with plain water.

To allay the intolerable thirst, small bits of ice placed in a cloth may be given the child to suck, which gives great relief; or teaspoonful doses of white liquid physic may be given, well diluted in water, say one teaspoonful of white liquid physic to a half glass of water.

Medicinal.—In acute dyspeptic diarrhea, where there is offending material in the bowel, there is nothing better than the old neutralizing cordial, though some prefer castor-oil. This is to be followed by the small doses of neutralizing cordial, or, if there be much fever, aconite three to five drops, and ipecac five to eight drops to half glass of water, a teaspoonful given every hour.

If the tongue be broad and pale, nux vomica drops two, to water four ounces, and a teaspoonful every hour, will replace the above. Where there is colicky, griping pains, colocynth three to five drops, will be added to four ounces of water, and a teaspoonful given every hour. Where the stools are greenish in color, lactic acid 3i, to water four ounces, will give good results. Chamomilla will also be well received in similar conditions. If the tongue be pasty, sodium sulphite grs. x to xx, to water four ounces, will be found of great value.

Where the stools are watery and green, arsenate of copper will give good results; about as much of the second trituration as will lay on a dime, will be placed in a half glass of water, and a teaspoonful given every hour.

If atony of the bowel exists, bismuth subnitrate or subgallate may be given. Colonic flushing may be used in some cases.

Cholera Infantum.—The stomach may be washed out by allowing the little patient to drink freely of water with a little bicarbonate of soda and the bowels flushed by a normal saline enema.

To allay the nausea and retching, aconite two drops, ipecac five drops to water four ounces, a teaspoonful every hour, will often accomplish the desired object. If not, place about twenty grains of the neutralizing powder in a cup, and add four ounces of *hot* water and a teaspoonful of brandy, and give in small sips. This is especially useful, if the fever is not high.

Rhus tox. five drops to water four ounces, and given every thirty or sixty minutes, will quiet the irritable stomach, where there is great cerebral spinal irritation.

Nux Vomica.—If the face is pale, tongue broad, lips full, two drops of nux, to water four ounces, will answer better.

Gelsemium.—When the child is restless and constantly rolls his head, add fifteen drops of gelsemium to a half glass of water, and give a teaspoonful every thirty or sixty minutes. With the above symptoms the head is hot, and the best results can be obtained, not only in cooling the head, but in quieting the restless condition, by sponging the head with *hot* water. *Do not* lay a cloth on the head, as the heat will be retained, but have one attendant gently sponge the forehead, while another attendant gently fans the patient; in this way the head can be rapidly cooled and the patient obtain rest.

Where the patient starts and cries out in his sleep, *rhus tox.* will be found beneficial. For the bowels, the first trituration of the monobromide of camphor, in three or five grain doses, or the small dose of the second trituration of arsenite of copper, will not disappoint.

Saline Solution.—Where the system is drained of its fluids, as noted in the flabby muscles, the pinched face, the cold extremities, the subcutaneous injection of four or eight ounces of normal saline solution (sodium chloride 3i , aqua Oj), will give better re-

sults than any internal medication. From eight to sixteen ounces can be used in twenty-four hours.

Ileo-colitis.—Here we have an inflammation of the ileum and the colon, and the treatment will be similar to that for all irritable and inflamed mucous membranes. Aconite and ipecac for the small, frequent pulse, elongated tongue, reddened at the end and edges.

Colocynth for colicky pain and the tenesmus and bearing-down sensation. Dioscorea, where there is tenderness over the abdomen. Where the fever is slight, the tissues full, and an astringent is permissible, bismuth subnitrate will give good results.

When the tenesmus is very severe and almost constant, an enema of opium and starch-water, ten to twenty drops of the former, to a tablespoon of the latter, will quiet the straining, and give prompt relief.

CONSTIPATION.

Synonyms.—Costiveness; Obstipation.

Definition.—The retention of fecal matter beyond the normal time, attended by great difficulty in expulsion, with a sense of insufficiency in action.

Etiology.—It is impossible to draw the dividing-line between a normal condition of the bowel and constipation; for while one well-formed stool per day is the rule, in some individuals two stools per day is the normal condition; while in others a stool every other day would be considered a condition of health. The causes are numerous, and may be described as follows:

Heredity.—Many children come into the world with a feeble constitution and weak intestinal track as their heritage; hence constipation is early developed.

Temperament.—Persons of a nervous and bilious temperament, usually pale and dark-skinned, with torpid liver, furnish conditions favorable for constipation.

Sex.—While constipation is not confined to one sex, it is very much more prevalent among females. They are more prone to neglect a regular habit, and, through false modesty, neglect the calls of nature, when in public buildings or conveyances. Also their life, as a rule, is less active than that of the male; again, frequent pregnancies weakening the abdominal muscles, or a

gravid uterus pressing against the rectum, or an inflamed and prolapsed ovary, are conditions that favor costiveness.

Sedentary life, and neglect to respond to nature's call, favor this condition. In this age of competition, where the almighty dollar is the goal of the great majority of the human family, nature's call is either neglected or postponed till the bowel loses its sensitiveness, constipation naturally resulting.

Cathartics.—The habit so many Americans have, of taking liver-pills, compound cathartics, and the many bottled waters that are on the market, for every ache and pain, is responsible for a very large proportion of the cases of constipation.

Diseases.—Wasting diseases and acute fevers, also anemia and chronic diseases of the lungs, heart, and liver; neurasthenia and chronic disease of the stomach and bowels; adhesions, resulting from peritonitis, dysentery, and enteritis, whereby the bowel loses its peristaltic action; painful diseases of the rectum, such as hemorrhoids, fissures, etc., cause the patient to refrain from stool as long as possible. Catarrhal disease, whereby a tenacious mucus is secreted, is also responsible for this common complaint.

Obesity.—Obesity weakens the abdominal muscles, and thus favors obstipation.

Tumors.—Growths, by their pressure, weaken and obstruct the bowel.

Foreign bodies, either as scybala, enteroliths, or seeds, may cause constipation.

Stricture is a local cause, while atony of the bowel is a very common, general, or systemic cause.

Excessive diuresis and diaphoresis, by withdrawing the fluids from the system, give rise to constipation.

Diet and Water.—A concentrated diet, that is largely deprived of debris, is conducive to constipation, as well as one that is coarse, in which there is an excess of waste; while a change of water, especially to one chalky in character, brings about the same condition.

Pathology.—No characteristic lesions are found as the result of constipation, though dilatation may follow long impaction of the colon. Stercoral ulcers may follow from pressure of scybala or masses.

Symptoms.—These vary in different individuals. In some the general health is but little affected if at all, if the bowels do

not move for days and days; while another feels uneasy and nervous if he does not have a stool every twenty-four hours. In my early practice I knew a man of active habits, who enjoyed perfect health, and yet often passed an entire week without stool, saying that he felt absolutely no discomfort.

The symptoms may be divided into local and general.

Local evidence of constipation is found in a sense of fullness and weight in the abdomen, occasionally colicky pains, and a dragging sensation in the rectum. Not infrequently diarrhea alternates with the constipation, where there is more or less flatulency and griping pains. When the stools consist of large, hardened, fecal masses, there is great pain in defecation, leaving the rectum quite painful for hours, and where this continues for a long time, results in painful hemorrhoids.

The general symptoms are legion. The most common are: headache, dizziness, a general sense of languor, bad breath, coated tongue, loss of appetite, palpitation of the heart, cold hands and feet, dark circles beneath the eyes, and melancholy or hypochondriasis.

In women, there are menstrual derangements, owing to pressure against the uterus and its appendages. Not infrequently there is neuralgia, owing to pressure upon visceral and sacral nerves. There is often torpor of the liver, with jaundice, a dry, harsh skin, or one cold and clammy. With these conditions there are dyspeptic symptoms. Pain in the cardiac region, extending to back and under the shoulder-blade, is not uncommon.

Where there is impaction of large masses of fecal matter, the systemic symptoms are so severe that the local condition may be overlooked, and the patient assume a very grave condition. The history of the following cases, which occurred early in my practice, affords a good illustration:

Mrs. O., aged about twenty-five years, mother of one child, complained of various aches and pains, but a gradual enlargement of the abdomen caused her to believe that she was pregnant, and attributed every new symptom that developed, as due to her condition, and made every preparation for a confinement. As time passed, her condition grew worse, and, having passed the time of her expected confinement, she grew anxious, and then alarmed, at her increased and enormous size. At this time, four months after her expected delivery, I was called to the case.

I found the abdomen very much enlarged, though uniform, and the patient quite dropsical; the skin white, inelastic, and doughy, and pitting on pressure. The woman suffered a great deal from abdominal pains. The case being obscure, I called a noted surgeon in counsel. After a careful examination, both digital and by sound, he diagnosed the case as ovarian tumor, and advised an operation. To this the patient asked a few days to decide, and the surgeon left for his home. Forty-eight hours later, I was hurriedly summoned to the house, where I found the patient in great pain. On getting out of bed to urinate, she was seized with a severe cramp, and was delivered of a fetus and after-birth, of about *six* months gestation.

The abdomen, however, was but very little reduced in size, and, six or seven days later, I drew a large wooden bucket full of fluid from the abdomen; after which, I could outline a hard, tumorlike substance occupying the left ileac region, and which I diagnosed as fecal matter. I then prescribed one tablespoonful of olive-oil every three hours; had the abdomen massaged with olive-oil every three hours, and an ounce of the oil injected into the bowel every five hours. Within forty-eight hours the tumor mass began to soften and give way, and, with the emptying of the bowel, the dropsy rapidly subsided, and an uneventful convalescence was rapidly terminated.

Diagnosis.—There will be no difficulty about diagnosing simple constipation, and should there be stricture due to malignant growths, the general health would be so impaired that the differential diagnosis could be made. Fecal impaction may be recognized by palpation, percussion, and the use of the rectal tube.

Prognosis.—Unless there is organic stricture or paralysis, the prognosis should be favorable.

Treatment.—Time, patience, regular habits, and persistency in the treatment, are essential to a cure. The constant use of cathartics must be prohibited, and the patient made to understand their harmful effect. To stimulate peristalsis, and at the same time obtain a better circulation in the bowel and abdominal muscles, direct the patient to knead the bowels for ten minutes before rising each morning, drink a glass of cold water, to which is added a drop of *nux vomica*, and after breakfast make an effort to have stool. If this method is regularly carried out each morn-

ing, it will not be long before a marked improvement will be seen.

Impress upon the patient the necessity of going to stool at a regular, stated hour each day, that success depends upon it, and that he or she must never be too busy to carry out one of the most essential parts of the treatment.

For the first few days, in extreme cases, to encourage the patient, fifteen grains of sodium phosphate may be given at bedtime, or a glycerin suppository may be used occasionally; but these should be used only when necessity demands their use.

Well-regulated exercise in the open air should be taken daily by all patients whose occupation necessitates a sedentary life. Where there is fecal accumulation, and where the bowel is lined by mucous feces, like a "teakettle is with lime," high colonic flushing should be used. Have the patient lie in bed, and, with a long tube, introduce into the bowel as much water as the patient can retain; then grasp the abdominal walls, and shake and rub the abdomen, passing the water from side to side, thus thoroughly flushing the bowel, loosening old linings; this will stimulate the bowel as nothing else will. This may be followed by using the double irrigator, allowing several gallons of water to flow in and out. Where the bowel has seemingly lost its peristaltic power, galvanism will be found useful. A raw apple, eaten before going to bed each night, has been found helpful in producing a regular habit, or he may eat each morning a fig-ball, composed of the following: Figs and dates, of each one pound; powdered senna two ounces, manna half ounce. Chop the ingredients very fine, and make into sixteen balls.

Fruits and green vegetables should constitute the principal part of the patient's diet. Should there be any rectal irritation, a common cause of constipation, it should be removed. Hemorrhoids, fissures, ulcers, papilla, pockets, etc., should be removed. Sometimes a thorough dilating of the rectum will accomplish much in this direction. After using a rectal speculum in the first dilation, the patient may use a graduated series of porcelain dilators, beginning with the smallest size, and, as the rectum becomes accustomed to its presence, use a larger size. The patient should drink freely of water, but avoid the many saline cathartic waters that are on the market.

DYSENTERY.

Synonyms.—Flux; Bloody Flux; Recto-Colitis:

Definition.—An acute and sometimes chronic, infectious disease of the large intestine, characterized, pathologically, by inflammation and ulceration of the mucous membrane; clinically, by frequent, small, painful, mucous or bloody stools, attended by great tenesmus and almost constant desire to evacuate the bowels, a fever of more or less severity, great prostration, and quite rapid emaciation.

History.—Dysentery is one of the oldest and most widely distributed of diseases which the physician is called upon to treat. That it is a very ancient disease is proven by the fact that it was well known to, and accurately described by, Hippocrates, Galen, Herodotus, and many other early writers. As evidence of its universal distribution, we have yet to learn of any part of the inhabitable globe which has not been visited by this unwelcome guest.

Although usually regarded as a disease of the temperate or tropical zones, Greenland, Iceland, Norway, Sweden, and Siberia have paid tribute to dysentery.

Of this disease Sodr  says, "There is no country, and no extensive district in any country, from the equator to the poles, in which dysentery has not been observed in the sporadic, endemic, or epidemic form." Great epidemics, attended by a high death-rate, have made dysentery one of the most dreaded lesions which affect humanity. Thus the epidemic which visited Sweden in 1857 claimed thirty-seven thousand victims, of whom ten thousand died; and in 1897, Japan was visited by an epidemic in which ninety thousand cases occurred, with twenty thousand deaths.

It prevails to an alarming extent in army and camp life, and Woodward, in speaking of its ravages during the War of the Rebellion, gives the record of cases occurring in both armies as two hundred and fifty-nine thousand and seventy-one cases of acute, and twenty-eight thousand four hundred fifty-one cases of chronic dysentery. This great number can, in all probability, be duplicated in all the great wars which have afflicted the human race during the centuries of warfare. Fortunately, with the observance of better sanitary measures, the disease is becoming

rarer, and the presence of dysentery does not now produce the alarm which it once occasioned.

Varieties.—The division of the older writers into acute and chronic is, I believe, better than the more modern division of catarrhal, amebic, and diphtheritic; for, as Sodré well says, "Dysentery is one, and one only, whether it be considered from an etiological, clinical, or anatomical point of view, and the latter division only tends to confuse the student. They are simply different phases or symptoms of the one disease."

Etiology.—Among the predisposing causes are the following:

Season ranks first, for by far the greatest number of cases occur during the late summer or early autumn months. Sudden atmospheric changes, where the days are hot but the nights cool, are conditions which favor dysentery. Climate also predisposes to the disease; for while we find dysentery from the poles to the equator, it becomes far more frequent, and finally epidemic, as we approach the equator.

Age.—While no age is exempt, it is more frequently found in adults. Males are more frequently affected owing to greater exposure.

Unhygienic surroundings predispose to the lesion, as shown by the frequent outbreaks in public institutions where sanitary measures are neglected, and in army and navy penal institutions.

Catarrhal conditions of the intestinal canal, as well as certain infectious diseases—such as typhoid fever, typhus fever, and, in fact, the eruptive fevers in general—predispose to dysentery.

While these various conditions favor the development of dysentery, it is not likely that any one, or all combined, ever produce the disease. They simply prepare a soil favorable to the development of the germ or toxin which gives rise to the disease.

The tendency of the disease to appear in epidemic form is one of the best evidences of its infectious character. It is true that we meet with sporadic cases, yet this may be said of a number of infectious diseases.

The Shiga bacillus, or *bacillus dysenteriae*, is regarded by many as the distinctive pathogenic agent, while others believe it due to a combination rather than an association of micro-organisms, a number of which constantly infect the intestinal canal. Bertrand, one of the most prominent advocates of this theory, says,

"Dysenteric infection is poly-bacterial, not specific." The most generally accepted specific germ is that described by Lamb in 1859, and Löscher in 1875, as *ameba coli*. The germ or toxin is most likely disseminated through drinking water.

Pathology.—The tissue changes in dysentery are quite varied, depending upon the severity and character of the attack. In the acute catarrhal form, especially if sporadic, the inflammation is nearly always confined to the colon and rectum, though in rare cases the ileum is involved.

The mucous membrane becomes hyperemic, swollen, and more or less injected, and bright-red in color, changing to a dusky hue, with increase of sepsis. The whole surface is covered with a tenacious, jelly-like, bloody mucus, often mixed with more or less purulent material. The solitary glands become swollen, and vary in size from that of a radish-seed to that of a pea. Necrosis may result, followed by ulceration. The submucosa may be invaded, becoming swollen and infiltrated, and, in the severer grade, extend to the serous and muscular coats.

In some cases, more frequently in children, the follicles bear the force of the attack, and the disease is known as follicular dysentery. Here there is infiltration, followed by necrosis and ulceration. These ulcers may be small and separate, or several may coalesce, giving rise to ugly, ragged, and irregular ulcerative patches. In the graver forms, usually the epidemic, pseudo-membranous patches form; hence the term, diphtheritic dysentery.

There may be extremes of tissue change, from the thin, slight, yellowish membrane, occupying circumscribed areas of the mucous membrane, to the most severe types, where a thick exudate of fibrin, pus, and blood invades the submucosa and serous coats. Necrosis taking place, this membrane sloughs away, leaving large, irregular ulcers. Where this is extensive, there is evidence of great sepsis, and death often results. Where healing follows, there is apt to be contraction of the ulcers, followed by more or less stricture.

In hot climates, where dysentery assumes the graver forms, it is known as tropical dysentery, or *amebic* dysentery. As in the forms already considered, the colon and rectum are the usual seats of the trouble, and as in the former, are characterized by hyperemia and infiltration of the mucosa and submucosa, with

the subsequent stage of ulceration. The ameba are found in the ulcers, in the coats of the bowels, and in the discharges. The infection is carried to the liver, probably through the portal circulation, and single or multiple abscesses are not infrequent. Abscess of the lung is a more infrequent result.

Chronic Dysentery.—In chronic dysentery the mucous membrane presents varied discolorations. Sometimes it is a dingy or brownish red, at other times of an ashy gray, or of a purplish, dusky hue. It is thickened in some parts, while denuded at others, thus giving portions of the gut a dilated or sacculated appearance, with stricture intervening. Ulcers of various sizes and shapes are found, while the entire bowel is bathed in a bloody or purulent mucus.

Symptoms.—Dysentery presents a variety of symptoms, depending upon the form of the disease and the amount of the bowel involved; also whether sporadic or epidemic. There is one group of symptoms, however, that is common to every form and may be said to be characteristic; viz., *pain, tenesmus, and frequent, small, bloody, mucous stools.*

Acute catarrhal dysentery, the form most frequently found in temperate climates, is very properly divided into sporadic and epidemic. The sporadic form, usually the milder, may be preceded for a few days by evidence of dyspepsia, with more or less uneasiness and pain in the abdomen.

Diarrhea is usually the earliest symptom, and may continue for twenty-four or forty-eight hours before the true dysenteric discharges are present. These begin by a frequent desire to go to stool, attended by colicky pain and tenesmus. The stools now are small, contain but little feculent matter, and consist of a jelly-like mass of mucus, with an admixture of more or less blood. There is a sensation as though the rectum is loaded, and must be emptied. There is great pain preceding and following each stool, with a peculiar burning sensation in the rectum.

There is some fever, though generally not of a very active character. The tongue is furred, and great thirst is experienced, the gratification of which increases the irritation already existing, and aggravates the patient's suffering. Unless early overcome, the disease grows severer each day, the face takes on an anxious and pinched expression, and the disease assumes the character of the epidemic form.

The latter is usually the more severe in character, and is truly a grave disease. "Epidemic dysentery occurs in two principal forms, though there are various gradations: there are cases with obstinate constipation of the small intestines, with an active grade of fever; and others where there is an irritability of the intestinal tract, with a low or asthenic fever.

"In the first form, the disease almost always commences with a well-marked rigor or chill, followed by high febrile action. The discharges from the bowels soon become frequent, are preceded and attended by tormina, the pains being of a severe, cutting character. The tenesmus, or desire to evacuate the bowels, is almost constant, and is very distressing during the operation, it seeming to the patient that the desire for an evacuation would never cease.

"No rest can be obtained during this condition, and, a natural consequence, the patient is very fretful and uneasy. The discharges from the bowels are sometimes pure mucus, at others mucus mixed with blood, and again seemingly almost pure blood; in each case the material being unchanged, not dirty or discolored, as in the next form of the disease.

"As it continues, we find that day by day the disease becomes more severe. The fever is remittent or continued, and very active, the skin being dry and parched, the pulse hard and frequent, pain in the head and back, the tongue coated, a bad taste in the mouth, and loss of appetite, the urine scanty, sometimes passed with difficulty, and anxiety and uneasiness from the almost total loss of sleep from the commencement of the disease. Up to the sixth or seventh day the symptoms will be thus acute; but after that, we find the fever assuming a typhoid type, and the discharges from the bowels become discolored and offensive, as in the next variety.

"The second form frequently commences as above described, the fever following the chill, or rigor, being acute. The discharges from the bowels are small, and composed of mucus and blood, and attended with an intense tormina and tenesmus. But in the progress of the disease it is found that any cathartic will start the small intestines into action, and we have more or less offensive feculent matter passed with the dysenteric discharges, or alternately with them. When this occurs, the typhoid symptoms, described below, soon make their appearance.

"In other cases, the discharges are semi-diarrheal at the commencement, and we find this irritability of the small intestines, and sometimes of the stomach, continuing throughout the progress of the disease. This feature of the disease must be noticed; for if we should give in this case a cathartic to increase secretion from the liver, and open the small intestines, we would many times set up an irritation that we would find it impossible to quiet."

Typhoid Dysentery.—Occasionally there is evidence of sepsis from the beginning of the attack. There is more or less depression from the start; patient feels tired, languid, and the bowels are loose. The tongue is broad, coated with a dirty, moist coating. The skin is clammy and relaxed; pulse small and quick; the temperature not very high, 100° or 101° , possibly 102° , and very rarely reaches 103° . As the disease progresses, the tongue becomes dry and brown, sordes appear on the teeth, while the stools become small and frequent, and are composed of mucus, blood, pus, and shreds of mucous membrane.

The stools vary in color. At times a grayish, pultaceous mucus; hence it is sometimes called *gray flux*. Again the mucus is pink or of a purplish hue. Day by day the patient grows worse. The face takes on a pinched or haggard expression, the nose is thin and blue, the eyes sunken, the pulse small and feeble, the temperature drops, the extremities are kept warm with difficulty, a cold sweat covers the body, and the patient dies in a state of collapse.

The pain is not so intense in this form, the nervous system being benumbed by the sepsis. Complications with the liver are more apt to be seen in this form.

In all severe forms of dysentery, whether sporadic or epidemic, the tormina may extend to the bladder, causing intense suffering.

Complications.—A peritonitis may follow by extension of the inflammatory process, or in rarer and usually fatal cases, by perforation. Abscess of the liver has already been noted, and is not infrequent in hot climates. Pericarditis and endocarditis in rare cases follow dysentery, where the latter has been prolonged for weeks or months. Paralysis has been noted in but few cases.

Diagnosis.—Dysentery is one of the most readily recognized of diseases of like severity. The frequent call to stool, the great

tormina and tenesmus, the character of the stools, jelly-like mucus mixed with blood, or the stool may be entirely of blood, the intense thirst and systemic disturbance can not be mistaken for any other condition. The inexperienced might possibly mistake a proctitis or hemorrhoids, fissure, stricture, or sympathetic irritation from the bladder for dysentery; but if one remembers the far greater systemic disturbance of dysentery, the mistake will be avoided.

Prognosis.—Although a grave disease, especially in the epidemic and typhoid forms, the Eclectic treatment has been peculiarly successful. In exceptional epidemics, where the type is peculiarly malignant, the prognosis must be guarded.

Treatment.—The treatment of dysentery consists not only in the proper selections of remedies, but in good nursing and careful attention to diet, for a great deal depends upon the care the patient receives. The patient should be put to bed with the first dysenteric stool, and perfect quiet enjoined. He must be impressed with the necessity of resisting the call to stool as far as possible; for many times the desire will pass away if the patient only exerts a little will power. Drinking water should be restricted, though bits of cracked ice may be allowed.

The diet should consist of hot milk, given in small quantities; if cow's milk can not be taken, malted milk in some form should be given. Albumen-water in very small quantities is well received; also scraped beef; but if irritation follows, it should at once be withheld. During convalescence cooked fruits may be used to advantage. Unless the patient has been constipated, and there is accumulation of feces, cathartics should not be given.

In sporadic dysentery the treatment is simple.

℞ Tincture Aconite.....gtt. v.
 Tincture Ipecac.....gtt. v.
 Aqua℥v. M.
 Sig. Teaspoonful every hour will be sufficient
 to effect a cure.

The aconite quiets the fever, and the ipecac relieves the intestinal irritation.

Where there is marked tenderness over the abdomen, *dioscorea* may be either alternated with the above, or replace the ipecac.

For the tenderness, and especially for the burning sensation in

the rectum, tincture *colocynth* will be found a valuable remedy. Where there is nausea, the tongue pale, a white ring around the mouth, pain pointing to the umbilicus, tincture *nux vomica*, gtt. v, to water ℥iv, will give prompt relief.

If the tongue be *moist* and *red*, with an irritable stomach, subnitrate bismuth in mint-water should be used, a teaspoonful every one, two, or three hours.

Where the tongue is *red* and *elongated*,

℞ Sulphate of Magnesia.....℥i
Water℥iv. M.
Sig. Teaspoonful every hour will give quick results.

The remedy, however, which will fit more cases than any other is the "white liquid physic." My father used the old formula, with the alum left out, and was remarkably successful in his treatment of dysentery. His prescription was:

℞ White Liquid Physic.
Simple Syrup.....āā ℥ii. M.
Sig. Teaspoonful every hour.

Where the patient was very thirsty, as he usually was, the doctor would put a teaspoonful in a fourth of a glass of water, and let the patient sip at pleasure; this quenches the thirst, and does not start the bowels. Of this treatment Dr. Cooper says, "White liquid physic comes as near being a specific for a given disease as any remedy can be."

Some patients can not take the remedy as strong as the above, and therefore it must be diluted. Thus I was called to see a very grave case of dysentery, where the stomach rejected all medication. On suggesting white liquid physic, the attending physician informed me that he had given the remedy, but the patient could not retain it. I then added *one teaspoonful* of the agent to a half glass of water, and the remedy was not only retained, but improvement began at once, and continued to recovery.

Where the call to stool is almost constant, and attended by great pain, an enema of starch and laudanum will afford relief; ten to thirty drops of laudanum to a tablespoonful of starch-water, the injection to be retained as long as possible. My friend, Dr. Eben Behymer, prefers the use of the opium suppository for the same condition; or, if the rectum is very irritable, a

half grain of powdered opium, in a small No. 4 capsule, will be better retained than a suppository.

Where the pain is unbearable, a hypodermic of morphia is justifiable, or a hot sitz-bath may answer the same purpose.

Where malaria prevails and there is a distinct periodicity manifested, quinia will be necessary in effecting a cure.

In epidemic dysentery, the treatment just outlined may be sufficient, though special cases will need careful study and additional treatment. In some epidemics the conditions are so similar, that nearly all cases will be benefited by the same medication, or, in other words, epidemic remedies meet the diseased condition, and the treatment is very simple. For example, the epidemic that prevailed so extensively at Harrison, Ohio, in 1868, and in which many died, was one in which the second trituration of podophyllin was a specific. My father was going night and day for several weeks, yet only lost two cases, and those elderly patients. Here the tongue showed the yellow, pasty coating, the yellow skin, full veins, and full tissue.

Where the evidence of sepsis is marked, showing typhoid symptoms, each case needs special study. The dirty, moist, pasty coating on the tongue calls for sodium sulphite. The *slick, moist, red* tongue, or spoiled-beef tongue, calls for sulphurous acid, while the *dry, brown* tongue, with sordes on the teeth, calls for hydrochloric acid. Echinacea and baptisia will be the remedies where the tissues are *full* and present a *purplish* or *frozen* appearance and the stools are of a prune-juice character, with shreds of mucus.

Where the bowel is not too sensitive, washing out the gut with boracic acid solution is good treatment. Where there is but little fever and the tissues are relaxed, nothing is better than subgallate of bismuth and opium. Five to ten grains of the former, and one-fourth grain of the latter, every three or four hours.

Where the tongue presents a *yellowish* or *bluish* color, with a *dirty, moist coating*, with a *bad breath* somewhat cadaveric, potassium chlorate and hydrastin phosphate should be administered.

It is hardly necessary to say, in this day of antiseptics, that the patient should be kept *clean*, and that his room should be well ventilated, and that Pratt's chlorides, or some equally good disinfectant, should be used freely.

CHRONIC DYSENTERY.

Chronic inflammation of the large intestine is usually the result of the acute form, though in rare cases it is subacute from the beginning. When not the result of an acute attack, a catarrhal condition of the rectum and colon usually precedes the disease, while wrongs of the liver and spleen are frequent. Dr. Scudder thus describes the disease:

Symptoms.—"The prominent symptom of the affection is more or less frequent discharges from the bowels, attended with more or less pain and tenesmus. The discharges vary greatly in color and character, sometimes a whitish-gray or yellowish mucus, occasionally mixed with blood, but more frequently with feculent matter. In some cases all the discharges are feculent, but of small size, and at the last part the mucus is discharged with tenesmus. In severe cases, the discharges are reddish, pultaceous, with more or less pus, and very offensive."

The small intestine may be either irritable or torpid. In the first case the feces are discharged in a fluid form; in the second, usually in hard masses, sometimes scybalous.

"In some rare cases we find more or less fluid feculent material with every discharge, and suppose from this that the small intestines are working; but the administration of a cathartic will bring away large masses of scybala.

"The condition of the general health varies greatly. Usually we find a dry, harsh skin, imperfect action of the kidneys, irregular appetite, more or less pain in the head and in various parts of the body, with great loss of flesh and strength. In some cases these symptoms are very marked, the patient being confined to his bed a considerable part of the time.

"Where the disease was contracted in a hot climate, the skin is frequently sallow and yellow, dry like parchment, or relaxed and flabby. In severe cases the disease is complicated with an intermittent fever, recurring every day, every other day, or at intervals of a week; all the dysenteric symptoms being aggravated at that time. The disease continuing, terminates fatally by exhaustion, or by ulceration and perforation, or more frequently by inducing an asthenic condition, terminating in disease of the lungs, liver, or brain."

Diagnosis.—"Chronic dysentery is one of the most easily

recognized of diseases, though the condition of the bowels and complications are hard to determine. Where any doubt exists the rectum should be examined with a speculum."

Prognosis.—"Where of not very long standing, the general health being pretty good, there is not much difficulty in its removal; but if of long duration, the general health being severely affected, and evidence of considerable structural change, the prognosis is uncertain."

Treatment.—"In the treatment of chronic dysentery we are not to forget the general character of the disease as well as the local trouble. There is usually derangement of the entire digestive apparatus, stomach, bowels, and liver. The secretions are also deranged. The skin is either dry and harsh, or relaxed and doughy. The kidneys are sluggish, and a successful treatment will necessitate the care of the entire organism.

"A good stomachic is desirable very early in the treatment, and there is none better than *nux vomica* and *hydrastis*. For the kidneys, saline diuretics are of much benefit. For the sluggish liver, podophyllin and leptandrin in small doses give good results.

"For the dysentery, *white liquid* physic is as efficacious in this form as it is in the acute. Where there is great relaxation, and the stools are a glairy or jelly-like mucus, bismuth subgallate and opium are among the best. Where there is *general soreness*, dioscorea is a most useful agent. The furred tongue, with *full tissues* and *doughy* skin, calls for the second trituration of podophyllin.

"For rectal irritation, where there is a feeling as though there was a foreign body in the rectum, colocynth is the remedy. Where the tongue is *coated in patches*, is *moist* and *pallid*, and the hemorrhage is *passive*, carbo veg., in three-grain doses of the first trituration, will prove curative.

"Where there is relaxation of the *entire* bowel, tincture of geranium or epilobium has been successfully used by our school.

As to local measures, they are often indispensable. A flexible rectal tube, carefully introduced a few inches into the bowel, and a stream from a fountain syringe allowed to flow till the bowel is slightly distended, when the tube is pushed in a little further, always following the distention caused by the flow till the tube is introduced a foot or more—in this way there is little danger of

injuring the bowel, and a thorough flushing is secured. Boracic acid, a tonic, or astringent wash, may be selected according to the needs of the bowel.

"Where the disease persists despite the treatment, an early examination of the rectum and sigmoid should be made with a speculum, and any wrong, such as fissure, ulcer, or hemorrhoid, should be corrected. If there be catarrh of the sigmoid, a pledget of absorbent cotton, smeared with balsam of Peru, and introduced through a sigmoid speculum by means of a long-dressing forceps, will give the most satisfactory results. This may be used every other day."

APPENDICITIS.

Definition.—An inflammation, acute or chronic, of the appendix vermiformis. This includes typhlitis, inflammation of the cecum, and perityphlitis, the peritoneal covering of the cecum. One can very readily see that these additional parts would be more or less involved in an acute inflammation of the appendix, and that a positive differential diagnosis can only be made post-mortem.

Etiology.—In examining various authorities, we find the causes assigned as responsible for appendicitis to be legion. From congenital malformation of the appendix to peritoneal adhesions; from la grippe to tuberculosis, and of foreign bodies there seems to be no end; especially aggravating, according to some writers, are prune-seeds, cherry-stones, grape-seeds, gall-stones, pills, fish-bones, etc.; one writer stating that the most frequent cause is the *pressure* from pins.

Heredity has been given as predisposing to appendicitis, while the ever-present bacteria have been charged with the responsibility of producing this affection.

Blows, injuries, strains, and indigestible food, all come in for a share as the causal agent. The truth is, the *cause* is unknown, though in all probability, the presence of fecal matter, together with decomposed gases, are most frequently the exciting causes.

Appendicitis occurs most frequently between the ages of sixteen and thirty, and among males more often than females, the ratio being four to one.

Pathology.—The pathology depends to some extent upon the degree of the inflammation. The inflammation, beginning in the mucous membrane, may extend to the submucosa and muscular and serous coats. In the milder forms, the inflammatory process is simply catarrhal, resolution taking place without ulceration. At other times various degrees of ulceration take place; it may be confined to the mucous membrane, and do but little harm; or it may extend into the deeper tissue, or even to perforation. In interstitial appendicitis, a fibrous exudate covers the outer or serous covering, and this forms adhesions with coils of intestines, walling off the appendix from the peritoneal sac.

Where ulceration and perforation occur rapidly, this new tissue may be perforated, the pus entering the peritoneal cavity; but if slow in its formation, the adhesions become strong enough to prevent this disaster. If ulceration occurs in a part not covered by the peritoneum, and is the part next the mesocecum, a circumscribed abscess results, and there will be little danger from peritonitis. In such cases the pus will make its way out where there is the least resistance. It may be downwards along the psoas muscles, and empty into the large or small intestine, or pass upwards to the diaphragm. It has been known to empty into the bladder.

When the ulceration occurs near the cecum, the nutrient artery may be destroyed, and the appendix slough off. In such cases the opening into the bowel is usually closed by adhesions before the escape of pus into the abdomen. In some cases a fibroid change begins in the distal end of the appendix, and extends to the proximal extremity, obliterating the lumen, and giving rise to what is known as appendicitis obliterans.

Symptoms.—The disease may come on insidiously with prodromal symptoms, such as loss of appetite, slight colicky pains, and constipation, the patient complaining of some tenderness or soreness in the right side, and in walking stoops or leans toward the affected side. Generally, however, the patient is seized with a pain in the abdomen, sometimes in the region of the umbilicus; or it may be general at first, but soon locates in the right ileac fossa. At first it is paroxysmal, the patient diagnosing it as colic, though pain is *elicited between paroxysms, if pressure is made over the affected spot.*

At the end of twenty-four hours the pain has become con-

stant. The position at this time is dorsal and the right leg is flexed to take off the tension by shortening the psoas and iliacus muscles. All bands of clothing are loosened, and not infrequently even the bed-clothing is not permitted to rest upon the inflamed part, the slightest pressure causing pain; a circumstance that renders a differential diagnosis from colic or indigestion quite plain.

Though the facial expression varies, the general expression is one of anxiety, which increases as the disease advances. The respiration is embarrassed, and, if the peritoneum is much involved, chiefly thoracic.

Nausea and vomiting is an early and somewhat characteristic symptom. Fever develops early, though moderate in degree, the temperature rarely going over 103° within the first forty-eight hours. In some cases no fever is present. Constipation is nearly always present, though there may be diarrhea. Frequent micturition is not an unusual symptom.

Physical examination of the abdomen reveals a slight tumor in the right iliac region, unless the peritoneum is involved and there is marked tympanites, when the abdomen is too sensitive to permit deep enough pressure to distinguish any tumefaction.

The particular point involved is McBurney's point; that is, one and a half to two inches from the anterior superior spine of the ilium, in a line drawn from it to the umbilicus. If the appendix be turned backwards, or if the tumor be small, the intervention of the distended coils of intestine may prevent its being detected by palpation. If mild, resolution will take place in a few days, by a subsidence of the fever, a yielding of the constipation, and the entire disappearance of the indurated mass in a week or ten days. In severe cases, the patient grows rapidly worse, perforation occurs, with abscess formation or diffuse peritonitis.

Diagnosis.—When a patient under forty years of age is suddenly seized with a pain in the right iliac fossa—the tender spot, McBurney's point—and there is nausea, vomiting, or obstinate constipation, and the patient lies on the back with the right leg drawn up, and an indurated tumor develops at the seat of pain, there is but little doubt as to the nature of the case.

Prognosis.—Although a grave disease, I am satisfied that a large per cent will recover if not subjected to the use of the knife. Where perforation with abscess formation occurs, the only re-

course, and the one that promises the only relief, is operation; but these will be found few in number if the patient be seen early.

Treatment.—While I am opposed to the use of active cathartics, I am satisfied that the administration of *small* doses of salts is very beneficial, or olive-oil may be substituted for the saline. At the same time enemas of warm water and glycerin will assist materially in opening the bowels. It may be necessary to use a rectal tube, introducing it as rapidly as the bowel fills with water. In this way the tube may be carried up to the transverse colon, and even beyond this in many cases. Too great force, however, must not be used in this method. Lobelia used in the enema will give splendid results.

Where there is fever, aconite or veratrum may be used with much benefit; and where there is severe colicky pain, colocynth will often give relief. Where the pain becomes unbearable, or the patient is constantly calling for relief, a hypodermic of morphia should be used, though opiates, as a rule, should not be given. Where abscess formation takes place, and there is no evidence of its pointing to the abdominal walls or of perforating the intestine, the surgeon should be called.

In recurring appendicitis—that is, after a patient has had three or more attacks of the disease, and is well during the interval between attacks—it is better to have the offending organ removed.

INTESTINAL ULCERS.

Probably no part of the body is more subject to the ulcerative process than the intestinal canal, and it may arise from various causes. The symptoms may be so slight as not to suggest the nature of the lesion, and the disease go undiscovered until revealed by an autopsy.

Various forms of ulceration are noted, the principal ones being stercoral and the simple ulcers attending catarrhal disease of the intestine, or the result of the infectious fevers.

Etiology.—The same causes that give rise to gastric ulcer may produce duodenal ulcer, and extensive burns are not infrequently followed by intestinal ulceration. Septicemia may be responsible for this condition, probably the result of embolism.

Amyloid degeneration of the intestinal blood-vessels are also cited as a possible cause.

Follicular and catarrhal ulcers develop in catarrhal enteritis of both children and adults. Long-continued constipation, attended by impaction of hardened fecal masses, may give rise to stercoral ulcers. Ulceration frequently attends the infectious fevers; especially is it found in typhoid fever, dysentery, diphtheria, small-pox, pyemia, and erysipelas. Of the chronic diseases, tuberculosis attended by ulceration and syphilis are the most notable.

Pathology.—The pathological changes are the same as take place in gastric ulcer, or that of any other mucous surface. The ulcer may be superficial, involving the mucosa, or extend to the deeper structures, even to perforation.

Symptoms.—The most constant symptom of intestinal ulceration, unless located very high up in the bowel or of a very superficial character, is diarrhea. Hemorrhage is also quite frequent, and unless retained in the bowel for some time, is bright red in color; otherwise it is tarry in character.

Pain occurs three or four hours after eating. The general symptoms depend upon the causes giving rise to it, and whether masked by the primary lesions. The stools contain pus, blood, shreds of mucus, fecal matter, and various bacteria.

Treatment.—The diet should be bland and nourishing, and though at first liquid in character, should be changed to a dry diet as soon as possible. Beginning with pepsin or sherry whey, malted milk, Mellin's food, imperial granum, Eskay's food, etc., we change to scraped beef, stewed sweetbreads, broiled steak, lamb-chops, toasted bread, baked potatoes, etc., but enjoin the use of tea, coffee, milk, or water while taking food.

In the way of medication, hydrastin phosphate, ten grains to four ounces of water, a teaspoonful every three or four hours, will give good results. Where the action of an astringent is desired, bismuth subgallate, in five or ten grain doses, is to be recommended.

Dioscorea will be used where there is soreness of the bowels, or colocynth if colicky pains are experienced. Epilobium and ipecac are not to be forgotten. Where the ulcers are in the sigmoid flexure or rectum, tampons of wool smeared with balsam

of Peru, and passed with dressing forceps to the seat of the ulcers, will prove of great benefit. They should be used two or three times per week.

CANCER OF THE INTESTINE.

Only a small per cent of malignant growths are located in the intestinal canal, variously estimated at from four to eight per cent.

Etiology.—Cancer generally occurs in the second half of life, or from the fortieth to the sixty-fifth year of age, and is more often found among males than females. Aside from heredity and age, various sources of irritation, such as fissures, ulcers, hemorrhoids, and fistulas predispose to carcinoma by furnishing a suitable soil for the development of the malignant germ, whatever that may be; and the frequency with which cancer locates itself in the rectum sustains this view.

Pathology.—The predilection for certain parts of the intestine is shown in the examination of two hundred and forty-three cases of cancer of the intestine, in the Pathologic Institute of Vienna. Thus, five were in the duodenum; six in the ileum; none in the jejunum; one hundred and eighteen in the large intestine; one in the vermiform appendix; fourteen in the cecum; sixty-three in the colon in general; forty in the sigmoid flexure; and one hundred and fourteen in the rectum. (See Nothnagel's "Encyclopedia of Medicine.")

The varieties of cancer found in the intestine do not differ from those occurring in other portions of the body; namely, scirrhus, encephaloid, colloid, and cylindrical-celled epithelioma.

Beginning in the mucous membrane, it soon invades the entire intestinal wall, frequently encircling the entire lumen, and in this way gives rise to intestinal obstruction; or it may be a diffuse, nodular mass, involving but one side of the gut.

The encephaloid and cylindrical-celled epithelioma are soft, fungoid in character, and rapidly ulcerate, while the scirrhus are slow in developing, and are late in ulcerating. Above the cancerous mass there is dilatation of the bowel, which forms a depot for fecal accumulations. The cancerous mass often invades contiguous parts. Fatal hemorrhage may result from deep ulceration, which sometimes attends these cancerous growths.

Symptoms.—There are no characteristic symptoms in the early stage, and in some cases they run their course with but little evidence of their malignant character, cachexia and anemia, that always attends carcinomatous growths. Where the growth develops rapidly there is generally slight fever, the temperature in the morning being 99° or 100°, and in the evening 101° or 102°. At other times the temperature is normal or subnormal.

The first symptoms, in some cases, will be evidence of occlusion, the patient being obstinately constipated, or diarrhea may attend, the stools consisting of a dark-brown, thin liquid, and very offensive; or the patient may pass small quantities of mucus, pus, and blood, with occasionally little balls of fecal matter, resembling the feces of sheep, or again it may be ribbon-shaped.

Pain is a common symptom, though varying in character. It may be dull, the patient complaining of soreness and tenderness on pressure, or it may be sharp, lancinating, and darting in character.

If the growth be located in the duodenum, there will be evidence of obstruction of the pancreatic and bile ducts, and dilatation of the stomach. If located in the lower part of the large intestine, there will be pain in the sacral region, extending to the genital organs. If in the sigmoid, the stools are apt to consist of mucus, pus, and blood. Rectal cancer is apt to be attended with intense pain in defecation, followed by tenesmus and exhaustion.

The patient early takes on a cachectic appearance, the skin becomes dry and harsh, and emaciation is rapid. The tumor mass may usually be felt through the flat abdominal walls; it may be movable or tied down by adhesion, and fixed. The mass is usually tender, any manipulation causing pain. The appetite is often retained and the tongue clean.

Diagnosis.—This is not always readily made. The age of the patient, heredity, constipation, cachexia, sharp, lancinating pain, emaciation, small bloody stools, and a palpable nodular mass, are the chief diagnostic symptoms.

Prognosis.—It is always unfavorable, the patient dying in from three or four months to three or four years.

Treatment.—Where the growth is located in the duodenum, there is generally dilatation of the stomach, which favors a retention of food, and fermentation of the gastric contents. To relieve

this unpleasant condition, frequent washing out of the stomach by the lavage tube will prove beneficial. The diet should be nutritious and easily digested, and better if given in fluid form.

The bowels should be kept open by use of the small strychnin, aloe, and belladonna pill. Morphia may be necessary to allay the severe pain. In rectal cancer, where the pain is intense, an opium suppository will give relief, or a small gelatine capsule containing one grain of powdered opium may be pushed within the rectum, where it will cause less tenesmus than a larger suppository. Where there is an offensive diarrhea, an antiseptic and disinfectant enema should be given several times per day.

CHOLERA MORBUS.

Synonyms.—Cholera Nostra; Sporadic Cholera.

Definition.—An acute affection characterized by nausea, vomiting of serous material, frequent watery stools, colicky pains, and severe muscular cramps, and attended by great prostration.

Etiology.—This is a disease of hot weather, beginning in June, increasing in frequency in July and August, and usually disappearing in September. Bad hygienic conditions predispose to cholera morbus, though the exciting conditions are unripe or overripe fruit, indigestible vegetables, such as cucumbers, radishes, egg-plant, etc. Drinking large quantities of ice-water when overheated, or tainted milk or water, may also be considered as excitants. It is more frequent among males than females, and among adults than in children, though cholera infantum may be considered the cholera morbus of children.

Pathology.—No characteristic anatomical changes take place. In some cases, catarrhal changes peculiar to gastro-enteritis are found, while in others no morbid changes are seen.

Symptoms.—The attack generally comes on suddenly, not infrequently in the night, and is announced by pain in the umbilical region, attended by nausea, which terminates in vomiting. At the same time the patient has an urgent call to stool, which is large, copious, and feculent in character. In a short time the retching and call to stool is almost constant, and the pain in the bowels is intense.

The stools vary in character; at first they are of a yellowish or yellowish-brown color, copious in quantity, and of a fecal character. As the disease progresses, however, they early lose their fecal character, and consist of a dirty water, even resembling the rice-water discharges of cholera.

Very early, cramping of the muscles of the legs, toes, and sometimes of the abdominal muscles, ensues, which is exceedingly painful, and causes the patient to cry out with his great suffering. In extreme cases, the spasmodic contraction of the muscles amount to opisthotonos.

The prostration is now extreme; the pulse is small, feeble, and frequent, the eyes sunken, the face blue and pinched, the extremities cold, the skin becomes relaxed and bathed in a cold, clammy perspiration. If not arrested, the patient's strength is gradually exhausted, he becomes dull and careless as to his condition, until finally coma and death result. Fortunately, this is a rare result, and before the alarming symptoms appear, the disease seems to have expended its force, the vomiting and diarrhea subside, and the patient makes a speedy and uneventful recovery, so that, after twenty-four or forty-eight hours, he is seemingly as well as ever.

Diagnosis.—We diagnose the disease by the large, copious, watery evacuations, pain in the abdomen, retching and vomiting, great prostration, and cramping of the muscles. Unless Asiatic cholera is prevailing at the time, it could hardly be mistaken for any other disease. Arsenical or ptomain poisoning would be recognized by the history of the case.

Prognosis.—It is nearly always favorable if seen reasonably early. When the patient is old and feeble, or a sufferer from Bright's disease or structural heart lesions, the prognosis must be guarded. If not seen till the stage of collapse, a fatal termination may occur. The only fatality I ever knew in this disease was of this character.

Treatment.—Direct a mustard-plaster to the abdomen and hot-water bottles to the feet. Internally, from a half to a teaspoonful of the compound tincture of cajupet every fifteen or twenty minutes will afford speedy relief. If the pain be severe, one teaspoonful of chlorodyne may be added to ten teaspoonfuls of water and a teaspoonful of the mixture given every fifteen,

twenty, thirty, or sixty minutes; or, what is better and much quicker in its results, a hypodermic injection of sulphate of morphin. The dose will be from a fourth to a half grain, according to the severity of the symptoms. This will not only relieve the pain, overcome the cramps, but generally allays the vomiting and diarrhea.

For the diarrhea, nux vomica and subnitrate of bismuth will prove beneficial. Where there is coldness of the extremities, a relaxed skin and threatened collapse, active measures must be used. Hot applications are to be made to the feet, legs, and trunk, or the limbs are to be rubbed vigorously with dry mustard.

In extreme cases, the patient should be rolled in a blanket wrung out of hot mustard-water. Internally, compound tincture of cajupet should be given, and strychnia one-thirtieth of a grain given hypodermically; or, what is better still, a five-per-cent solution of camphor and ether administered hypodermically. The dose will be from twenty to thirty minims, as often as the heart's action demands its use.

At the same time a pint of normal saline solution should be given subcutaneously. The diet should be restricted for a few days following convalescence.

INTESTINAL OBSTRUCTION.

Synonym.—Ileus.

Definition.—A partial or complete occlusion of the intestinal canal, due to compression of the bowel, invagination, twisting, adhesions, or foreign bodies.

Etiology and Pathology.—It may arise from various causes, among which may be enumerated: "1. Bands of adhesion, the result of inflammatory action; 2. From a congenital intestinal pouch becoming adherent; 3. From the appendix ceci assuming a fixed and adherent position; 4. From the twisting of the intestine upon its own axis, upon the mesentery, or upon other coils of intestine; 5. From tumors developed in the mesentery, leading to constriction; 6. From intussusception; 7. From cancerous disease of the intestine; 8. From contraction of cicatrices, as after dysentery or fever; 9. From enteritis or peritonitis; 10. From impaction of feces, or of foreign bodies, as gall-stones, etc.; 11.

Obscure forms of hernia, as into the obturator foramen, etc.; 12. Prolapsus-ani and inflamed hemorrhoids; 13. Abdominal or pelvic tumors." (Habershon.)

Some of these cases are readily determined, and may be excluded from the subject, as enteritis, peritonitis, prolapsus-ani, inflamed hemorrhoids, and abdominal or pelvic tumors. Again, it has been contended by some authors that all the symptoms found in these cases may be produced by a spasmodic state of the intestine, no strangulation or cause of obstruction being detected after death.

Symptoms.—"In the early stage of the affection, the patient is obstinately constipated, and complains of an uneasy sensation at the part where the obstruction exists, being sometimes able to place the hand directly on the part. In a longer or shorter time he complains of a twisting or violent pain about the umbilicus, without tenderness on pressure; in fact, frequently relieved by it. Nausea comes on, with frequent retchings, vomiting of the contents of the stomach, then of bile, and finally of feculent matter.

"The abdomen becomes very much distended by gas, is tense and tender, the countenance shrunk and anxious, the extremities cold, with frequently cold, clammy perspiration, hiccough, and gradual failure of vital power.

"The disease pursues a variable course. Sometimes the suffering is extreme at the commencement, and all the worst symptoms above named appear in twenty-four or forty-eight hours; in others, the disease will not terminate fatally under six or seven days; and in some cases the large intestine being the seat of the obstruction, it may last for three or four weeks."

Diagnosis.—"Much difficulty is experienced in detecting the character of these cases, as the symptoms at first are none of them distinctive. If of sudden occurrence, as when the patient feels a sudden, severe, colicky pain when straining at stool, becoming more and more severe, and attended with tenesmus and constant desire to go to stool, but unable to pass anything from the bowels, we have a tolerably plain case.

"In other cases we are led to believe that there is intestinal obstruction by the continuance of the constipation, sufficient means having been used for its removal; by the fixed location of

the severe pain, and the constant nausea and marked prostration. At a later stage, the continuance of all the above symptoms, and the appearance of stercoraceous vomiting, are positive evidence.

"If the patient has had peritonitis, we have reasonable ground to conclude that it results from adhesions. Tumors are likely to have given rise to previous uneasiness, and to be so developed as to be diagnosed on examination. Cancer will have been of long duration, and given rise to disturbance of the bowels, and the ileus of slow formation. Impaction of feces may sometimes be determined by the hard, irregular tumor that presents, and its sudden appearance; obscure hernia by its location and the circumscribed character of the pain."

Prognosis.—"The prognosis in these affections is unfavorable, though many recover. If there is continued increase in the severity of the symptoms, the nausea and vomiting being intense and persistent, and especially of stercoraceous material, with great prostration and anxiety, the prospect is very poor. If, however, the bowels are moved, the pain being mitigated, the patient will recover. In some cases of intussusception, when the symptoms are very severe, the patient still retains his strength, the nausea abates somewhat, and after two, three, or four weeks of suffering, a portion of the intussuscepted bowel is discharged, and the patient recovers. So many of these have occurred, that we would not despair, even after having employed all the means recommended without success, for nature will sometimes step in, and thus save the life of the person."

Treatment.—"In almost all cases purgatives will have been thoroughly tried before we are called, so that we will not have to regret the giving them as one of our errors; still, cases will undoubtedly occur in which symptoms will be so obscure that we will administer them ourselves, to the great detriment of the patient. In all cases, the administration of opium and an infusion of dioscorea, in sufficient quantity to relieve the pain, will be all the internal medicine usually of use. The nausea must be quieted as much as possible, by the use of the means heretofore named: an infusion of compound powder of rhubarb, peach bark, subnitrate of bismuth, ice, morphia, etc., and the employment of counter-irritation to the epigastrium. The association of chloroform, sulphuric ether, or tincture of gelsemium will be advan-

tageous in some cases, the two first especially in cases of tympanitis.

"To relieve the obstruction, large quantities of fluid—thin gruel is as good as anything—should be thrown up the bowel with a pump syringe. As much as from half to one gallon may be thus used, completely distending the large intestine. This may be repeated several times per day; or, what is deemed even better than this, the introduction of air by means of an air-pump, until the large intestine is distended to its full extent. Change of position is sometimes advantageous, at others hurtful, and the same may be said of the sudden application of cold water. Great relief may sometimes be given by the use of the hot sitz-bath, and occasionally by the use of hot fomentations to the abdomen.

"The question of surgical interference in bad cases becomes one of anxious consideration, as in some cases the obstruction is of such character as that it might thus be relieved with the greatest facility. Mr. Hilton has resorted to this mode of relief with success, but others have signally failed. When it can be determined that the obstruction is of the large intestine, the operation for *artificial anus* offers the best chance for success. If the means first named do not prove successful, we endeavor to prolong the patient's life, hoping that nature will step in and remove the obstruction. We thus use stimulants in small quantities, and nutritious enemata, and such means as will relieve the sufferings of the patient as much as possible." (Scudder's "Practice.")

VIII. DISEASES OF THE LIVER.

JAUNDICE.

Synonym.—Icterus.

Definition.—Jaundice is a symptom rather than a specific disease, and is found in various affections of the liver. It is characterized by a deposit of bilirubin in the various structures and fluids of the body, which gives them a yellow or jaundiced hue.

Until recently, two varieties of jaundice have been recognized; (a) *Hepatogenous* or *obstructive jaundice*; and (b) *hematogenous jaundice*, due to a toxic state of the blood resulting from

various poisons acting either directly upon the blood or upon the liver cells.

The investigations of Stadelmann, Hunter, Naunyn, Min-kowski, and others, have seemingly disproved the doctrine of hematogenous jaundice, and most pathologists agree that all forms of jaundice can only come from obstruction, hepatogenous.

Etiology.—1. The obstruction in catarrhal jaundice is due to inflammatory tumefaction of the duodenum or bile-ducts.

2. Foreign bodies, such as gall-stones or parasites, within the ducts.

3. Tumors within the duct, or by pressure from without; such as tumors, gravid uterus, or fecal matter.

4. Stricture, or obliteration of the duct.

CATARRHAL JAUNDICE.

Synonyms.—Icterus Catarrhalis; Duodeno-Cholangitis; Inflammation of the Common Bile-duct.

Definition.—A catarrhal inflammation of the lining membrane of the biliary ducts, especially the larger, and the duodenum, and attended by discoloration of the skin and tissues from a consequent retention and absorption of the bile.

Etiology.—Catarrhal jaundice is most frequently secondary to catarrh of the gastro-duodenal mucous membrane, the inflammatory process extending from the duodenum to the larger duct, and through this to the smaller ones beyond. It usually follows an attack of indigestion, or may be the result of cold and exposure. It not infrequently occurs in the course of the infectious fevers; such as pneumonia, typhoid fever, and malaria. Great emotional disturbances are sometimes followed by jaundice, and poisoning by phosphorus may also give rise to it, while, in chronic heart or kidney lesions, there is frequently portal obstruction, which is attended by the same results.

While it may occur at any age, it is more common in early life, between the ages of two and seven, and more often seen in males than in females.

Pathology.—That portion of the duct lying in the intestine is more frequently and seriously affected, though the inflammation may extend to the cystic or even hepatic duct. The mucous mem-

brane lining the ducts is swollen and inflamed. The liver is usually congested, slightly enlarged, and of a deep yellow color. The gall-bladder is usually distended with bile. The ducts are occluded by the swollen mucosa and plugs of inspissated mucus.

Symptoms.—The symptoms that precede the staining of the tissues are those of gastro-intestinal catarrh, anorexia, coated tongue, nausea, and sometimes vomiting, sense of weight in the epigastrium, with constipation of the bowels, although, in exceptional cases, there is diarrhea.

The symptoms of jaundice vary very greatly, depending upon the nature of the hepatic lesion and the complications attending it. Within three or four days after the above named symptoms have taken place, discoloration of the skin and conjunctiva occurs.

The yellow tinge begins in the eyes, forehead, and neck, gradually extending over the body, the color being deepest in the wrinkles and folds of the skin. The color is generally of a lemon hue, becoming darker and assuming a bronze or greenish tint as the hepatic lesion assumes a graver character.

The urine is but slightly diminished in quantity, but becomes dark-brown or coffee color, and when agitated, foams, the froth showing a decided yellow tinge. When it comes in contact with the linen, it stains it yellow. The test usually employed for the detection of bile is that of Gmelin, and consists of placing a few drops of urine on a porcelain slab, and adding an equal quantity of nitric acid. If bile be present, a rapid play of colors results, in which green is characteristic.

The perspiration also contains bile pigment, and will stain the clothing, which is especially noticeable under the armpits. The tears, saliva, and milk scarcely ever contain bile pigment. Should pneumonia complicate the hepatic lesion, the expectoration is sometimes tinged with bile. The stools are drab or of a putty color, and generally very offensive.

The pulse is often greatly reduced in frequency, sometimes dropping to thirty, or even twenty beats per minute. This action is supposed to be due to the impression made upon the cardiac nerves by the bilirubin, and is not considered of grave importance.

A very unpleasant symptom is an intense pruritus, that develops when the disease assumes the chronic form. It may be

general, or confined to the palms and soles, and between the fingers and toes, and is usually worse at night after the patient becomes warm in bed. The scratching that seems almost irresistible, is accountable for the papules, pustules, ulcers, and crusts, so often present. Urticaria, boils, carbuncles, and hemorrhages are sometimes present. In severe chronic cases, xanthelasma—yellow spots—are sometimes found.

The bile acids variously affect the nervous system. There is usually headache, and vertigo is not uncommon. Despondency, irritability of temper, and insomnia will characterize some icteric patients, while others become drowsy and listless, and are inclined to sleep most of the time. Where there is severe structural lesion of the liver, grave cerebral symptoms may develop, such as delirium, convulsions, coma, and death.

Diagnosis.—The diagnosis of jaundice is readily made, although sometimes the exact lesion giving rise to it is quite difficult to determine.

Prognosis.—The duration of catarrhal jaundice is from a few days to six or eight weeks, the average being from ten days to two weeks. The prognosis is therefore favorable. Where the yellow hue continues beyond two months, and especially where the hue assumes a darker shade, or where hemorrhage occurs in the skin and mucous membranes, with an elevation of temperature, the outlook is unfavorable.

Treatment.—This will depend altogether upon the conditions present. If there be no complications, and there is but little fever, chionanthus will be the only remedy required.

℞ Chionanthusʒi.
 Waterʒiv. M.
 Sig. A teaspoonful every one, two, or three
 hours.

This will bring about a speedy clearing up of the tissues. If the circulation be feeble and a tendency to capillary congestion, aconite and belladonna will be given in connection with the chionanthus.

Where the fever is active, veratrum will replace the aconite. Where there is *irritation* of the nervous system, gelsemium will prove highly beneficial. When there is fullness in the region of the liver, full tongue, and heavily coated, full tissues and full

veins, podophyllin is the remedy *par excellence*. As much of the second trituration as will lie on a dime, every two or three hours, will bring good results. For the dry skin, an infusion of dioscorea and asclepias, or diaphoretic powder, will be called for.

If the tongue be moist and coated and there is constipation, sodium phosphate in twenty-grain doses, every four or five hours, will be of marked benefit. Where the skin is yellow, sodden, and inelastic, the tongue moist and yellow, and no fever, chelidonium should not be overlooked. Where the tongue is broad, pale, and flabby, and there is puffiness under the eyes, and the kidneys are sluggish, potassium acetate four drams, to water four ounces, a teaspoonful every four hours, the patient drinking copiously of water after each dose, will assist materially in clearing up the skin, by flushing the kidneys and eliminating the coloring matter from the blood. Where there is nausea, with thick tongue, nux vomica and hydrastin must not be forgotten. Where acids are indicated, the hydrochloric or nitric acid, given every three hours, will greatly aid in effecting a cure. Euonymus is a useful remedy in jaundice where malaria is a complication, and a tonic and stimulant is required.

Additional treatment, as given by Dr. Scudder in his practice, is as follows:

"If the disease comes on slowly, and has lasted for some time, the vegetable alteratives, with saline diuretics, the judicious use of tonics, and the thorough use of the bath, will be the principal means. If there should be tenderness on pressure over the liver, the irritating plaster will materially aid the treatment. Being satisfied that there is no structural lesion, making it impossible for the liver to respond to the action of remedies, we may employ small doses of podophyllin as above named. In these cases I have used the tincture of leptrandra and dioscorea, with the compound syrup of rhubarb and potassium, also nux vomica with hydrastin, as heretofore named.

"If from exuberant secretion of the bile, as evinced by bile in the feces, and sometimes by bilious diarrhea, the administration of leptandrin, dioscorea, and opium, with cups to the side, will be appropriate. If from congestion of the portal circle, manifested by bloated countenance, livid lips, and absence of bile in the feces, the treatment should be commenced with a saline purgative, the use of the hot foot-bath, and other means to deter-

mine to the skin, and saline diuretics. These means may be followed by agents that act directly on the liver, chionanthus deserving especial mention. Potassium chlorate, with extract of conium, sometimes answers an admirable purpose.

"If there is manifestly torpor of the liver, the jaundice being slight, the common compound podophyllin pill may be used, and frequently with the result of speedily removing the difficulty. When the cause is obscure, the indications should be met as they arise, all harsh and debilitating measures being studiously avoided."

Where the jaundice is due to mechanical causes, such as gall-stones, tumors, etc., the treatment will be surgical.

Diet.—The diet is quite important in the treatment of jaundice. Fruits, most vegetables, soups, sweet milk and buttermilk, the alkaline waters, or what is equally beneficial, *plenty of pure water*, are to be recommended; while fats, sweets, pastries, and highly seasoned food should be avoided.

The patient should bathe daily, followed by brisk rubbing, and one or two Turkish baths per week will greatly aid the cure.

INFANTILE JAUNDICE.

Synonym.—Icterus Neonatorum.

Etiology.—It is not positively known what causes give rise to temporary or evanescent icterus in the new-born. Some have attributed it to a reduction of blood-pressure in the hepatic capillaries due to arrest of the umbilical circulation, while others attribute it to stasis in the smaller bile-ducts, which are compressed by the distended radicles of the portal vein.

The severe form of jaundice may be due to congenital closure or absence of the common or hepatic duct, to hepatic syphilis of congenital form, or to septic infection due to phlebitis or the umbilical vein.

Symptoms.—Jaundice is quite common in the new-born, affecting boys more than girls, and is said to occur more frequently in children born after chloroform narcosis of the mother, though an experience of twenty-five years does not confirm this view.

It generally makes its appearance on the second or third day,

the skin becoming of a yellowish hue of various shades. The child may be quite drowsy for several days, although otherwise there seems to be but little functional disturbance, the child nursing as usual and digesting what is taken into the stomach. The urine is highly colored, staining the napkin and clothing with which it comes in contact. After the bowels are emptied of the meconium, the feces become colorless, as in older patients. The discoloration continues from one to three or four weeks, usually disappearing the second week.

In the *severe form*, the icteric hue may not appear for several days, but gradually increases in intensity, the skin assuming a bronze or yellowish-green color. The abdomen becomes full and tumid, owing to congestion of the liver and spleen. Although the child nurses well for a time, it is soon apparent that digestion and assimilation are impaired, the child assuming an aged and wrinkled appearance. Hemorrhage from the cord may occur, which early terminates the life of the little patient.

When due to syphilis, there are the usual symptoms that accompany this affection; namely, snuffles, skin eruptions, fissures at the angles of the mouth, and enlarged liver and spleen.

Prognosis.—The mild or simple form is favorable, usually terminating in ten days to two weeks. The severe form, however, is generally grave, the disease terminating fatally.

Treatment.—But little treatment is necessary. Chionanthus will clear up the skin a little earlier than if the condition is left to nature, and for this reason should be used.

When due to syphilis, echinacea will be our best agent.

MALIGNANT JAUNDICE.

Synonyms.—Acute Yellow Atrophy of the Liver; Icterus Gravis.

Definition.—A grave form of jaundice characterized by necrosis of the hepatic cells and atrophy of the liver. Marked cerebral symptoms accompany this form of jaundice.

Etiology.—This is a rare disease, but seldom seen in this country and in Europe. It occurs more often in women than in men, and between the ages of twenty and thirty, though it has

been found in children. Pregnancy predisposes to this form of icterus, and it has been known to follow fright or profound mental impressions.

The exciting cause is not known, but from the rapid and extensive destruction of hepatic cells, a toxin of a virulent type is, in all probability, responsible for the disease.

Pathology.—The liver shows marked atrophy, being not more than two-thirds or one-half of the normal size, is thin, flabby, and the capsule wrinkled. On making a section, a yellow or reddish-yellow surface is presented. The hepatic cells are found in every stage of necrosis, from those in which the process is just begun to those completely destroyed. When the cells are entirely destroyed, there may be seen a fatty, *granular debris*, in which pigment cells and crystals of leucin and tyrosin are found.

There is usually granular degeneration of the kidneys, and fatty degeneration of the heart is quite common. Most of the organs are bile-stained, and hemorrhages are frequent. The spleen is found enlarged.

The bile-ducts and gall-bladder are found empty.

Symptoms.—The disease usually begins as though it were a case of catarrhal jaundice, gastro-duodenal symptoms being the most prominent. This may continue for but a few days, or for two or three weeks, during which time the skin has assumed an intense icteric hue. Finally vomiting of an intractable form develops, and not infrequently blood is ejected with the vomitus.

Cerebral symptoms now develop; there is intense headache, trembling of the muscles, delirium, and sometimes convulsions. The icteric hue now rapidly deepens, the patient becomes dull and drowsy, and typhoid symptoms develop. The tongue becomes dry and brown, with sordes on the teeth and lips; hemorrhages occur from mucous surfaces and in the skin, and the delirium assumes the typhoid type. The disease may run an afebrile course, although usually attended by fever.

As no bile enters the intestines, the stools are light or putty-colored. The urine is bile-stained, and contains tube casts, leucin and tyrosin.

Jaundice.—After the first few weeks, the disease presents symptoms that are characteristic; namely, persistent vomiting,

hemorrhages, severe headache, delirium, and frequently convulsions, atrophy of the liver, and the presence of leucin and tyrosin in the urine. While cerebral symptoms may appear in any severe form of jaundice, and although the clinical symptoms of hypertrophic cirrhosis are almost identical with that of icterus gravis, yet the absence of leucin and tyrosin in the urine will enable one to make the differential diagnosis.

Prognosis.—This is a disease that has usually proved fatal; therefore the prognosis is not favorable.

Treatment.—The disease is so rare in our country that Eclectic remedies have been but little used. Should one meet the disease, we would try our antiseptics. Echinacea and baptisia would be among our first remedies tried, in the hope that the sepsis might be overcome and the toxins neutralized. Other remedies would be tried as the condition would indicate.

VASCULAR LESIONS OF THE HEPATIC CIRCULATION.

HYPEREMIA.

Synonym.—Congestion of the Liver.

Definition.—An excess of blood in the liver; this disease is usually of short duration.

Etiology.—The physiological hyperemia that occurs during digestion should hardly be considered in this connection, except in high livers, who habitually overeat and overdrink, in which case it frequently leads to functional derangement, and, in case of too free indulgence of alcohol, may lead to structural changes. It may occur as a result of certain infectious fevers, especially dysentery, malaria, yellow fever, enteric fever, and Weil's disease. It has followed suppressed menstruation.

Symptoms.—The symptoms are not very characteristic, usually those of gastro-intestinal catarrh. There is a sense of fullness in the right hypochondriac region, and sometimes tenderness on pressure. The tongue is coated; there is a bad taste in the mouth, with nausea, and sometimes vomiting. There is usually headache. The skin is of a brown or muddy color, and

sometimes there is slight jaundice. Constipation is the rule, and the patient is irritable or despondent; dizziness and mental depression are common.

Diagnosis.—This can only be made after a careful study of the case.

Prognosis.—This is favorable; the condition is not dangerous, although it may pass into the passive form, and sometimes results in structural changes.

Treatment.—The diet must be light and nutritious. Rich and highly seasoned food must be prohibited, and alcohol positively forbidden. A milk diet is perhaps the best. The bowels should be kept open. Podophyllin is just as effective to-day as it was when used by the fathers, if the indications for its use, full tissues, full tongue, with dirty, moist coating, from base to tip, and a dirty, muddy complexion, and more or less headache are present. Of the second trituration, three grains every three hours will give good results, and, if the patient does not object to its harsh action, from a fourth to a half of a grain of podophyllin may be given. In place of this, the patient may visit some one of the many mineral springs, drinking freely of its waters.

PASSIVE HYPEREMIA.

Synonyms.—Passive Congestion of the Liver; Nutmeg Liver; Cyanotic Liver.

Definition.—Enlargement of the liver due to an increase of venous blood.

Etiology.—Increased pressure in the sublobular branches of the hepatic veins causes an engorgement of venous blood, and is most frequently due to chronic cardiac lesions, especially those affecting the right heart, the blood being dammed back in the inferior vena cava and hepatic veins. This retardation of the blood also occurs in pulmonary lesions, such as chronic interstitial pneumonia, pleural effusions, and intrathoracic tumors.

Pathology.—The liver is enlarged, smooth, and of a dark-red color. A section reveals an engorgement of the hepatic vessels; these, compressing the hepatic cells, produce atrophy of many of them, while brown pigment is deposited in the lobules; this

gives the liver a mottled appearance, which has given to this disease the title nutmeg liver. The sluggish circulation favors fatty infiltration. When of long standing, connective tissue formation occurs about the intralobular veins.

Symptoms.—These depend largely upon the primary lesions giving rise to it. In addition to the cardiac or pulmonary symptoms, there will be a sense of fullness and tenderness in the right hypochondriac region. Gastro-intestinal catarrh is usually present, and hematemesis may occur. There is usually more or less jaundice. Owing to portal obstruction, ascites occurs, followed later by general dropsy. The stools are light or clay colored, and the urine is colored by bile. On palpation, the liver is found enlarged and tender, sometimes extending several inches below the costal margin.

Treatment.—This is directed largely to removing the cause, or, where that is impossible, to modifying its effects. Thus hygienic and dietary measures must be carried out, even although it is due to valvular lesions; but we will also use digitalis, cactus, convallaria, and other cardiac remedies. The bowels should be kept open, which is better accomplished with the salines and vegetable cathartics. Podophyllin, polymnia, chionanthus, and like remedies, influence the liver favorably, and will be used. Where there is respiratory trouble, lobelia, bryonia, and asclepias are to be given.

DISEASES OF THE PORTAL VEIN.

THROMBOSIS.

Etiology.—Thrombosis of the portal vein is quite rare, and may be preceded by syphilis of the liver, cirrhosis, cancer, pressure by tumors, perforation of the vein by gall-stones, and peritonitis, where the gastro-hepatic is involved.

Pathology.—The clot which at first is of a yellowish-gray color, may suppurate, or it may become organized into connective tissue, the vein becoming like a fibrous cord, and is known as adhesive pylephlebitis adhesiva. Occasionally the clot becomes channeled, the circulation becomes re-established, and a cure may result.

Symptoms.—Unless the occlusion be complete, the symptoms are negative, or may resemble those of cirrhosis. Where there is complete obstruction, ascites rapidly develops, there is swelling of the spleen, and hemorrhage from the nose, stomach, and bowels.

Diagnosis.—This is extremely difficult, and often only made positive during an autopsy. Perhaps the most suggestive symptom is rapid engorgement of the portal system, and quick development of ascites.

Prognosis.—This is always grave, although some recover.

Treatment.—This is not very satisfactory, and usually only gives temporary relief. It is entirely symptomatic, meeting the conditions as they arise. Fluids should be used sparingly, and when ascites is marked, paracentesis should be performed. The diet should largely consist of fruits and vegetables.

SUPPURATIVE PYLEPHLEBITIS.

Purulent inflammation of the portal vein or its branches, due to the breaking down of a thrombus, may result from appendicitis with abscess, ulceration of the bowels, peptic abscess, abscess of the spleen, septic infection by way of the umbilical cord in the new-born, and by foreign bodies penetrating the intestines, and later the portal vein.

There is enlargement of the liver and spleen, with marked tenderness in the right hypochondrium. There is more or less jaundice, the tongue is heavily coated, and nausea and vomiting are not infrequent. The fever is of an irregular type, with night-sweats. The evidences of septicemia are pronounced.

The diagnosis is made by grouping the clinical symptoms. The prognosis is unfavorable, and the treatment palliative.

Affections of the hepatic vein are very rare, although they may occur in chronic enlargement of the heart.

Enlargement of the hepatic artery sometimes occurs in cases of cirrhosis of the liver, although extremely rare.

CIRRHOSIS OF THE LIVER.

Synonyms.—Interstitial Hepatitis; Gindrinker's Liver, Sclerosis of the Liver; Nutmeg Liver; Hobnailed Liver.

Definition.—A chronic disease of the liver, characterized by an increase in its connective tissue, a reduction in the size of the organ, and a degeneration of the parenchymatous constituents.

Etiology.—Fibrous cirrhosis is due to irritants of various kinds carried to the liver by the blood-vessels, especially the portal vein, the bile-ducts, or by way of the peritoneal capsule.

In the great majority of cases, the disease is due to alcohol; in fact, more cases are due to this cause than all other irritants combined; hence the term, *gindrinker's* or *drunkard's* liver. The time required for the development of the disease depends upon the quantity and strength of the alcohol digested.

Syphilis, so often contracted as the result of drinking, also holds a prominent place as a causal agent.

Highly spiced and very rich foods, ptomaines, lead, arsenic, phosphorus, and antimony are also considered as factors in producing the disease. Irritants due to the infectious fevers, especially scarlet fever, typhus fever, dysentery, cholera, and chronic malaria, are occasionally responsible for the disease.

Cirrhosis may result from chronic obstruction of the bile-ducts, due to gall-stones, tuberculosis, or congenital causes.

Eichorst believes that cirrhosis may result from cardio-vascular changes, and constitutes the cardiac liver. The cause of the hypertrophic cirrhosis of Hanot is obscure. It is a comparatively rare affection, occurring most frequently in the male, and between the ages of twenty and thirty-five years.

Cirrhosis most frequently occurs between the ages of thirty and sixty years, although it may be found in the extremes of life. Men are more liable than women to contract the disease, owing to greater dissipation.

Pathology.—Two conditions of drunkard's liver are found: the atrophic cirrhosis of Laennec and the fatty cirrhotic liver.

Atrophic Cirrhosis.—The liver is greatly reduced in volume, sometimes being no more than one-third the normal size. It is firm, hard, and cuts with great resistance. It is rough with granules or nodules, which vary in size from a small shot to that of a marble, which gives it the name *hobnailed* liver.

A cut surface reveals grayish-white bands of connective tissue, surrounding yellowish parenchymatous patches. The process of degeneration commences in the tissues surrounding the terminal

branches of the portal vein, and gradually extends to the larger branches.

As the disease progresses, the hepatic cells and portal vein become more and more compressed, with an increased obstruction of the circulation. A cut surface reveals, at first, a pulpy mass, which is gradually replaced by connective tissue, with shrinking or atrophy of the organ.

Fatty Cirrhotic Liver.—In this form the liver is large, smooth, or but slightly granular, yellowish-white in color, and cuts with much resistance. The fat is greatly increased, and resembles somewhat a fatty liver. The connective tissue, as in atrophic cirrhosis, is greatly increased. In both forms degeneration of the hepatic cells and obstruction of the portal circulation are the chief characteristics.

The capsule of the liver, especially between the nodules, is thickened and opaque, and is frequently united to the peritoneum by fibrous bands.

The peritoneum is generally involved, being opaque, thickened, and sometimes infiltrated with blood pigment, and stained with bile. More or less fluid is found in the cavity.

The stomach and intestines show a catarrhal condition, and the spleen is enlarged.

The *hypertrophic liver* (Hanot) is greatly increased in size, sometimes weighing as much as four hundred grams. It is yellowish green in color, smooth or granular on the surface, is tough, and cuts with much resistance. The peritoneal covering is frequently adhered, and is much thickened. The liver cells are enlarged and contain more than one nucleus.

Large, round cells and fibroblasts are found in the intralobular portion of the organ. Syphilitic cirrhosis, either congenital or acquired, reveals a large, tough, resistant liver, resembling very much an amyloid liver. The microscope shows a great increase in the connective tissue, with areas in which are found many round and spindle cells. Gummata, varying in size from a small shot to a pigeon's egg, are also found.

In *biliary cirrhosis*, the liver is large, firm, and usually smooth. A cut section reveals a reddish-yellow surface. The bile-ducts are dilated, with frequently sclerotic thickening about them.

In *Glissonian cirrhosis*, as a result of peritonitis involving the perihepatic membrane, the capsule undergoes fibrous degenera-

tion, becomes thick, hard, and resisting, and adheres to surrounding organs. As a result of this hypertrophy of the capsule, the liver, by pressure, becomes atrophied.

Symptoms.—*Atrophic Cirrhosis.*—Where the compensatory circulation is maintained, the disease may exist for months without any characteristic symptoms. The first noticeable, are often attributed to wrongs of digestion, rather than to diseases of the liver, and consist of anorexia, belching, full red tongue, bad taste in the mouth, vomiting, flatulency, constipation alternating with diarrhea, sensation of pressure in the epigastrium, and tenderness in the right hypochondrium—symptoms due to obstructed portal circulation.

As the disease progresses, all the above symptoms become aggravated, with occasional hemorrhage from the gastro-intestinal tract. When the hemorrhage occurs from the distended veins of the stomach or esophagus, it is vomited; and when from the intestines, it is passed from the rectum. These hemorrhages occur at irregular intervals, and may persist for months. Sometimes large quantities of blood are thus lost, though it seldom ever results fatally.

Hemorrhoids are quite common, and are due to passive congestion of the inferior hemorrhoidal veins.

The liver is at first enlarged, and may extend a handbreadth below the ribs. Later it atrophies, though to what extent can not be determined by palpation. The abdomen becomes puffy, and the superficial epigastric and internal mammary veins, enlarging, form the "caput medusa" about the umbilicus.

With the progress of the disease, emaciation becomes marked, the features are pinched, and the skin assumes a dirty or muddy hue, rather than the jaundiced. The spleen becomes greatly enlarged, owing to enormous congestion. As compensatory circulation fails, ascites develops, sometimes leading to enormous distention of the abdomen, and crowding of the diaphragm, which, in turn, gives rise to marked dyspnea, the result of pressure upon heart and lungs. As a result of ascitic pressure upon the inferior cava and ileac veins, and also enfeeblement of the general circulation, edema of the legs, feet, and external genitals occurs.

The urine is scanty, high-colored, and contains bile, and is

loaded with urates, and rarely contains albumin and tube-casts. When albumin is found, it is usually due to fibrous changes in the kidney.

The temperature is usually normal, or subnormal, though there may be slight fever, the temperature registering 100° or 102°. Although the toxic agent has not yet been determined, a toxemia sometimes develops, attended by an active delirium or stupor, coma, and convulsions.

Fatty Cirrhosis.—The symptoms of fatty cirrhosis so closely resemble those of atrophic cirrhosis that, aside from the increased size of the liver, one is not able to differentiate the one from the other.

Hypertrophic Cirrhosis.—The early symptoms of this form do not differ materially from those of the forms already considered; viz., gastro-intestinal; and it is only after the liver enlarges, grows painful, and jaundice becomes marked, that the symptoms become characteristic.

When the liver reaches its maximum size, it encroaches upon the adjoining parts, and is quite tender on palpation. Jaundice is a marked feature, and icterus gravis, attended by high fever and delirium, may develop at any time during the disease.

The spleen is greatly enlarged, and, when very painful, is due to a peripleuritis arising. The urine is quite scanty, concentrated, and of a high specific gravity, and contains bile pigment. Ascites does not occur. Hemorrhages from various parts of the body occur, especially from the mucous surfaces. The disease runs from three to ten years, the patient finally dying, with symptoms of icterus gravis, from extreme cachexia, or from hemorrhage.

Syphilitic cirrhosis, aside from the history of infection, has similar symptoms to the atrophic form, while *capsular cirrhosis* has no characteristic symptoms.

Biliary Cirrhosis.—Perhaps the most characteristic symptom is the rapidity with which jaundice appears, and frequent attacks of hepatic colic. If due to gall-stones, and their passage is affected, the jaundice disappears. Where the liver remains enlarged, the symptoms are the same as those of ordinary cirrhosis, with an exaggerated jaundice and ascites.

Diagnosis.—The history of alcoholic indulgence, enlarged abdomen, ascites, and hemorrhage from stomach and bowels, would give a comparatively positive diagnosis, while marked

difference in the size of the liver would suggest the variety, whether fatty or atrophic. If there be a history of syphilis, and syphilitic lesions are known in other organs, and if the liver be enlarged, hard, and irregular, this form would be recognized.

The hypertrophic form would be suggested by its chronicity, absence of ascites, marked jaundice, hemorrhages from various parts, and enlarged liver and spleen.

Prognosis.—This is generally unfavorable. The absence of characteristic symptoms during the early stage renders an early diagnosis difficult, if not impossible, and the process of degeneration has proceeded so far, in most cases, that a permanent cure is the exception. Early treatment may, however, stay the progress of the disease, and render the patient comparatively comfortable for years.

Treatment.—Alcohol must positively be prohibited, and all highly seasoned food restricted. The diet should consist of the blandest kinds of food; such as milk, wheys, broths, the more easily digested cereals, and fruits.

To relieve the nausea and vomiting, *nux vomica*, *hydrastin*, *rhus tox.*, *ippecac*, *bismuth subnitrate*, and like remedies, will be found useful. Where the tongue is broad and coated with a moist, dirty yellow coating, and there are full tissues, *podophyllin* will be useful.

Where the skin is sallow and the tissues sodden, *chelidonium* will be indicated.

Chionanthus, from ten to twenty drop doses, will be called for where the jaundice is pronounced.

The bowels should be kept in a soluble condition, and some one of the many saline waters may be used.

Apocynum will be suggested by dropsical effusions. When the abdomen becomes filled with fluid, temporary relief will be afforded by resorting to *paracentesis abdominalis*.

Syphilitic cirrhosis will call for *echinatea*, *phytolacca*, *rumex*, *iris*, *corydalis*, *berberis*, *Donovan's solution of arsenic*, and iodide of potassium.

ABSCESS OF THE LIVER.

Synonyms.—Suppurative Hepatitis; Hepatic Abscess.

Definition.—A circumscribed collection of pus in the substance of the liver.

Etiology.—Abscess of the liver results from the introduction into its substance of some irritant, usually infectious. It may enter directly from an injury, through the blood-vessels, and by way of the bile-ducts. The large, single abscess, commonly known as the tropical abscess, because found in the hot climates, may occur idiopathically, although more frequently it is the result of dysentery. It occurs quite frequently among Europeans sojourning in India, who are addicted to the drink habit, and overeat of rich, highly spiced foods. In this country, it occurs in the Southern States. The researches of Kartulis, Councilman, and Lafleur point strongly to the ameba coli as the causal agent, notwithstanding the fact that the ameba may be present, the feces well formed, no evidence of dysentery, and yet well-marked signs of hepatic abscess.

The frequency with which abscess follows injuries of the abdomen would suggest traumatism as a cause. Blows over the liver occur most often in boxers and railroad brakemen, and this class are more frequently affected. Injuries to the head have also been followed by abscess of the liver. Following the blow a toxin is generated and carried to the liver, which acts as the irritant.

Embolism of the portal vein or hepatic artery is a common cause of abscess of the liver, and may arise from a general pyemia or suppurative process in the region of the liver. In this way abscesses may follow typhoid fever, appendicitis, dysentery, piles, and pelvic abscess, the infection being through the portal vein, and through the hepatic artery, in ulcerative endocarditis and gangrene of the lung.

Suppurative cholangitis; suppuration of the bile-ducts, due to gall-stones; parasites, such as echinococci, lumbrici, distomi, or foreign bodies, nails, pins, needles, fishbones, etc., may give rise to abscess of the liver.

Pathology.—*Large, Solitary, or Tropical Abscess.*—These abscesses, while generally single, are occasionally multiple, and often coalesce, forming one immense ulcer, the size of a child's head, and may contain several quarts of pus.

The liver is generally enlarged, the abscess electing the right lobe, and the convex side rather than the concave. Where the abscess is of long standing, there is connective tissue change in

the neighboring parts, so that it becomes thick, tough, and somewhat cartilaginous.

The pus varies in character and may be grayish, mucoid, creamy, and often of a reddish-brown color. It may be sterile or rich in staphylococci or amebæ coli.

In traumatic abscesses, the pus is more often sterile, is yellow, of a creamy consistency, or thin, icherous, and reddish-brown.

The abscess develops in the direction of the least resistance, working its way to the surface, and penetrates parts showing the least obstruction.

"Of three hundred cases reported by Waring, fifty-six per cent remained intact; sixteen per cent opened by operation; nine per cent ruptured through the lung; five per cent perforated the pleura; three per cent entered the colon. There are other instances where the abscesses entered into the hepatic and bile vessels, and into the gall-bladder, while Flexner has reported two cases of perforation into the inferior vena cava." (Osler.)

Nature sometime sets up an adhesive peritonitis, thus walling off the pus, which opens through the abdominal wall.

Multiple Pyemic or Embolic Abscesses.—When the abscess producing material is carried to the liver by the portal vein, multiple abscesses usually arise in the liver, while the rest of the body remains free; while, if brought by the arteries, various other organs are also involved in the abscess formation. In multiple abscess, the liver is enlarged, smooth, and may present a normal appearance. At other times, small, white or yellowish-white spots appear beneath the capsule, showing the ulcer spots. On making a section, numerous small abscesses, varying in size from a pinhead to a California cherry, are seen, and contain pus of various quality, sometimes laudable, and again fetid, and of a reddish-brown color, due to staining from the bile, and various cocci are found in its contents. On probing these abscesses, they are found to open into the portal vein or its branches. In some cases the entire portal system within the liver may be involved. Occasionally suppurative cholangitis occurs, usually the result of obstruction from gall-stones, the ducts and gall-bladder containing pus.

Symptoms.—They vary greatly, and may be so slight as to cause no suspicion of the true nature of the lesion till it is re-

vealed by a post-mortem, showing death by a rupture of the organ, or by passing pus through the bowel or bronchi. Small abscesses may give rise to no other symptoms than pyemia.

Usually the forming stage is attended by headache, loss of appetite, and general malaise, with more or less chilly sensations. The temperature for a time may be subnormal, but with a well-marked rigor; the temperature runs up to 103° or 104° . Like septic fever in general, it is irregular, and may be either of an intermittent or remittent type.

Night-sweats are a common feature. In chronic cases there may be no fever, the temperature often being subnormal. The pain is located in the region of the liver, radiating to the back and right shoulder. When deep-seated, it is of a boring character, but when near to the surface, it is sharp and lancinating. With the advance of the disease, the enlargement of the liver crowds the diaphragm, irritating the right lung, and a hard, dry cough results, unless there is perforation of the lung, when there will be expectoration of a reddish-brown pus, resembling anchovy sauce.

Digestion is impaired, the tongue is covered from base to tip with a dirty, yellow coating. There is nausea and occasionally vomiting. Constipation alternates with diarrhea. As the result of faulty nutrition, the patient becomes emaciated, the skin is jaundiced or of a muddy color. With the further progress of the disease, typhoid symptoms appear, the tongue becomes dark-brown or black, is dry, sordes appear on the teeth and lips, the mind wanders, typhomania develops, and sometimes convulsions occur.

Physical Signs.—Inspection reveals marked fullness in the right hypochondrium, and if the abscess is located in the anterior portion of the right lobe, there will be a bulging of the ribs, the distention extending several inches below the costal margin.

Palpation reveals a large, round, hard tumor, and in some cases fluctuation is noted.

Percussion.—There is increased dullness in all directions, but more pronounced upwards and to the right, in severe cases reaching as high as the fifth rib in front, and the scapula in the back. This extensive dullness upwards enables one to differen-

tiate abscess from cancer, dullness in the latter case being downward.

The clinical symptoms of multiple abscess can not be separated from the above. The liver is enlarged and tender, and the skin more or less jaundiced.

Diagnosis.—In the early stage it is almost impossible to make a positive diagnosis, but when well advanced, the true nature of the disease is comparatively easy to discern. The enlargement of the liver, with pain and tenderness on pressure and fluctuation when superficial, the icteric or muddy color, emaciation, hectic fever, and night-sweats, can hardly be mistaken.

It is sometimes confounded with intermittent or remittent fever, but appropriate treatment soon relieves the latter, while the former is not benefited by remedies that overcome malarial fever. When in doubt, the aspirating needle should be used, and, if pus be found, the true nature is revealed.

Prognosis.—In pyemic or multiple abscess the prognosis is almost invariably unfavorable, and the single abscess is also grave, the mortality ranging from fifty to sixty per cent. Where the abscess is superficial, or when early recognized and promptly evacuated, the best results are obtained.

Treatment.—This is largely symptomatic, till the abscess points, when the treatment becomes surgical. The patient's strength should be maintained as far as possible, the stomach kept in good condition, the bowels not allowed to become constipated, the proper antiseptics administered, and the pain mitigated.

Echinacea, polymnia, podophyllin, chionanthus, potassium chlorate, and muriatic acid will be the most prominent remedies indicated. The salines may be given if the bowels are constipated. The subnitrate or subgallate of bismuth when diarrhea prevails.

The diet should be nourishing but easily digested.

AMYLOID LIVER.

Synonyms.—Waxy Liver; Lardaceous Liver.

Definition.—A deposit of starchy-like material in the substance of the liver.

Etiology.—This is a part of a general and peculiar degeneration, in which the spleen and kidneys are frequently involved. It may be congenital, although it is usually associated with prolonged suppurative processes, especially of a tubercular nature, and where the bones are involved. Next in frequency is syphilis, either hereditary or acquired. It is also found associated with chronic malaria, rickets, ulceration of the rectum, cancer, and other affections, characterized by depravity of the blood.

It occurs more frequently in men than women, and between the ages of twenty and forty, although it may occur at any age of life.

Pathology.—The organ is of exaggerated size, sometimes double that of health, is symmetrical, smooth, and edges rounded. The color is pale yellow or mottled. On section, the liver is found tough and resisting, and, when treated with an iodine solution, stains a mahogany-brown color. The capsule is tense, smooth, and glistening.

Symptoms.—There are no characteristic symptoms of this form of degeneration. There is no jaundice, although the stools may be light or clay-colored. The patient is pale or waxy, there is anemia, and, in the advanced stage, dropsy.

Digestion is impaired; there is loss of appetite, furred tongue, eructation of gas, nausea, and sometimes vomiting. Constipation is the rule early in the disease, and diarrhea later. The urine is scanty, high colored, and contains albumin and waxy tube-casts, due to degeneration of the kidneys. There is usually but little, if any, pain, and no fever.

The physical examination reveals enlargement of the liver to the extent of bulging in the right hypochondrium. The edges are sharply defined. There is generally enlargement of the spleen in most cases, due to the same degeneration.

Diagnosis.—The history of the patient previous to the enlargement of the liver is of great diagnostic value; this, with enlargement of the organ, absence of pain, and tenderness, general anemia with dropsy, and increase in size of the spleen, and albuminuria, renders the diagnosis comparatively easy.

Prognosis.—This is unfavorable, the disease extending over a period of months or years, but always progressive. Death

results from anemia, kidney complications, pneumonia, dysentery, or exhaustion. Dropsy is usually marked at death.

Treatment.—In the treatment of amyloid liver, we are to remember that back of the disease is a depraved blood from syphilis, suppurative processes, malaria, etc., and that only in so far as we are able to correct these wrongs will we be able to stay the process of degeneration. Recognized late in the disease, we have no specific for the degenerated condition, and our efforts are directed to correcting the wrongs of the blood. In this way we prolong the patient's life, but a permanent cure is not to be encouraged.

Suppurative bone lesions are to be corrected, when existing, —anti-syphilitics, such as echinacea, Donovan's solution, stillingia, corydalis, etc., when due to syphilis, and quinia, when due to malarial wrongs. Having accomplished these ends, such remedies as echinacea, nux vomica, hydrastin, polymnia, stillingia, rumex, iris, phyto-lacca, etc., will be used.

A nutritious diet of nitrogenous articles, with a minimum amount of fat and plenty of fruit, will give the most favorable results. Exercise in the open air should form an important part in the treatment. Alcoholic stimulants should be avoided. Farinaceous, starchy foods, and sugar, should also be restricted.

FATTY LIVER.

Synonym.—Steatosis of the Liver.

Definition.—The term fatty liver may be applied to two conditions,—fatty infiltration and fatty degeneration. In fatty infiltration, there is an increased amount of fat in the normal cells, and is supposed to result from some constituent of the food, such as fat, or from carbohydrates. In fatty degeneration of the liver, the protoplasm or albuminates of the liver-cells are replaced by fat and the liver substance destroyed.

In infiltration, the fat varies, and in the normal liver is from three to five per cent, increasing after a full meal, particularly when the food is rich in the carbohydrates.

Etiology.—Aside from the physiological fatty liver, due to milk diet in infants, and the ingestion of a large quantity of carbohydrates, fatty liver is due to excessive use of alcohol and beer.

Insufficient exercise, especially in hearty eaters, favors the accumulation of fat, owing to imperfect oxidation of the fatty particles ingested. Also imperfect oxidation due to tuberculosis of the lungs, pernicious anemia, and chlorosis.

It may be due to certain poisons, among which may be mentioned phosphorus, arsenic, copper, antimony, mercury, the aluminum salts, iodoform, carbolic acid, the mineral acids, and ptomaines from fish, oysters, etc. It may occur as the result of the infectious diseases, especially such as are followed or attended by long-continued pus formation, as puerperal fever, erysipelas, etc.; the poison arising from acute yellow atrophy; as a result of general obesity, the liver acting as a receptacle to the excess of fat.

Pathology.—In fatty infiltration, the liver is increased in size, sometimes weighing from twelve to fifteen pounds, yet of such low specific gravity as to float in water. It is smooth, with rounded edges, and of a light-yellow color. On section, it is dry, and leaves the knife oily. The protoplasm of the cell is crowded to one side by the oil-drops.

In fatty degeneration, the liver is smaller than normal, is smooth, of a light-yellow color, soft and easily torn. On section, the cells are found degenerated, and a yellowish-gray, or mottled, friable, oily substance, is presented to the eye.

Symptoms.—There are no characteristic symptoms attending this condition. Ascites and splenic enlargement are rare, and, when present, are due to complication. Jaundice is usually absent, for in advanced cases the bile is but little lessened in quantity.

The stools are light colored, however, and constipation may alternate with diarrhea. When the liver is very much enlarged, there will be gastro-intestinal disturbances, with loss of appetite, flatulence, nausea, and sometimes vomiting; diarrhea, alternating with constipation occurs, and the stools contain mucus.

There is a sense of fullness in the right hypochondrium, and the liver, on palpation, is found large, smooth, soft, and doughy, and extending several inches below the costal ridge.

Course and Complications.—The disease runs a chronic course, depending largely upon the complications existing, which often include fatty degeneration of the kidneys and heart. Where the kidneys are involved, the urine is scanty, high colored, and

contains albumin, fat, or oil-casts, and crystals of cholesterin. When fatty degeneration of the heart complicates the disease, the pulse is irregular and feeble, and frequent attacks of vertigo and syncope occur. Later edema of the extremities and general anasarca take place.

Diagnosis.—The enlargement of the liver, it being smooth, with rounded edges, and soft and doughy, would suggest its true character, especially if the patient has freely indulged in beer and alcohol, and been a high liver or eaten largely of the carbohydrates, and followed a sedentary life. The history of infectious diseases, or acute yellow atrophy, would also suggest fatty liver.

The absence of jaundice, ascites, and splenic enlargement, would also render the diagnosis more positive.

Prognosis.—This depends upon the condition. Fatty infiltration is not to be regarded as very serious; but fatty degeneration is a more grave lesion, especially when due to acute yellow atrophy or the more grave infectious diseases.

Treatment.—This will be largely hygienic and dietary. The patient should take plenty of well-regulated exercise in the open air. He should abstain from alcohol, beer, and sweet wines. Fatty, farinaceous, and starchy foods are to be avoided, and the patient should take sparingly of fluids.

The diet should consist of albuminoid substances, such as lean meats, fish, vegetables, and fruits. Plain broths may be used sparingly. The saline alkaline waters may be used freely. Gastric complications will be treated as they arise, and will call for hydrastis, nux vomica, rhus tox., ipecac, etc.

NEW GROWTHS IN THE LIVER.

Under this head are included cancer, sarcoma, and adenoma in the malignant class; and fibroma, angioma, and cystoma in the benign class.

CARCINOMA OF THE LIVER.

Etiology.—Cancer of the liver, especially as a primary lesion, is very rare, and occurs between the ages of forty and sixty. Primary cancer occurs more frequently in the male than in the

female, due, no doubt, to the greater frequency with which males are affected with cirrhosis, malaria, and alcoholism, factors that predispose to cancer. *Secondary* cancer, on the other hand, is found with greater frequency in women, being secondary to cancer of the uterus, ovary, and breast.

Traumatism, infectious processes in general, parasites, and heredity are regarded as predisposing factors in cancer of the liver.

Primary carcinoma of the gall-bladder is frequently associated with chronic irritation and obstruction from gall-stones, and probably accounts for the greater frequency of this affection in women than in men, the female being more frequently troubled with gall-stones. The same causes predispose to cancer of the biliary passages.

Pathology.—Three forms are recognized in primary cancer: (a) The *massive* cancer; (b) the *nodular* cancer; and (c) the *infiltration* cancer.

The *massive cancer* may cause enormous enlargement, and weigh as much as twenty-five pounds. Beginning in the liver as a round tumor, it rapidly develops into a hard mass, involving the parenchyma of the liver. The healthy tissue is *not* cirrhotic. The capsule is not adherent to the peritoneal covering, although sometimes thickened.

Nodular cancer does not show the enlargement of the above-mentioned variety, there being widespread cirrhosis, with contraction and induration. This variety resembles secondary cancer of the liver. The nodules vary in size and number, are grayish or yellowish, and distributed throughout the liver.

Infiltration Cancer.—In this form, cancerous masses are infiltrated throughout the parenchyma of the liver. The capsule is often thickened, and adheres to the peritoneum and other organs. The liver is uniformly enlarged.

Histologically, primary cancer cells do not differ from carcinoma of other parts, being epithelial in character, their shape being changed by pressure, some being polyhedral, others hexagonal. Giant cells are also found in the cancerous mass.

Secondary Carcinoma of the Liver.—This form is generally readily distinguished from the primary form by the enormous enlargement of the liver, and the presence of nodules projecting above the surface; also the tendency to degeneration of the nodule,

causing its central contents to recede, and making many of the nodules umbilicated. The nodules, both on the surface and when cut, present a grayish-white or yellowish aspect.

So much of the organ may be involved that every trace of the parenchyma of the liver may disappear. Degeneration of the cancerous tissue may result in cavities or cysts, into which hemorrhages occur, and also into the gall-bladder and peritoneum. The hepatic cells atrophy, as the result of pressure of the cancerous mass. Cirrhosis is not an uncommon accompaniment, and areas of fatty degeneration are also found.

Histologically, secondary cancer does not differ from the primary form, save in the tendency to the various degenerations already mentioned. Cancer of the gall-bladder and bile passages may be primary or secondary, the latter often following cancer of the stomach, intestine, and pancreas.

Symptoms.—The symptoms of cancer of the liver vary, depending upon the location and stage of development. In the early stage, and when located in the interior of the liver, they are negative. When secondary to cancer of the stomach, intestine, rectum, uterus, ovary, etc., the symptoms are more pronounced than when the growth is primary.

Carcinomatous cachexia may be the first evidence of the lesion, and in some cases remains the chief feature to the end. Enlargement of the liver is usually pronounced, and palpation reveals the hard, nodular character of the organ, especially if the growth be near the surface. With the greater involvement of the organ there will be disturbance of the portal circulation, and consequent gastro-intestinal disturbances, such as nausea, vomiting, and sometimes hematemesis.

Pain is a common symptom, at times of burning, boring character; at other times it is darting and lancinating; although usually located in the right hypochondrium, it may extend to the right shoulder and scapular region.

Jaundice is present in most cases at some stage of the disease. Where the portal circulation is seriously compressed, ascites develops, and, when very great, obscures the physical examination. The temperature is usually normal or subnormal during a greater part of the disease; but in the advanced development, the temperature rises, and in some cases reaches 105°. The fever at this time is irregular or intermittent.

Progressive emaciation is characteristic, and the skin becomes dry, wrinkled, and icteric. In some advanced cases, where there is marked toxemia, there may be severe headache and delirium, followed by coma.

Diagnosis.—Where the liver is greatly enlarged, and the surface is nodular, the diagnosis is comparatively easy; but in the smoother forms, and when deep seated, it may be mistaken for other hepatic lesions. If, however, there is the cancerous cachexia, emaciation, pain in right hypochondrium, extending to the right shoulder and scapular region, and ascites, the diagnosis is positive.

Prognosis.—It is *always* unfavorable, the disease being progressive, usually terminating in death within a year.

While we do not pretend to cure cancer, there are a few remedies that tend to retard the development, allay the worst features of gastric disturbance, and render the patient comfortable to some degree. Echinacea neutralizes to some extent the toxemia generated in carcinoma, and should be given during the course of the disease. Dr. Webster thinks that it also lessens the pain. The dose will be from five to twenty drops four times per day. Hydrastis has long been considered by the Homeopaths as influencing carcinoma. Eclectics can testify to its influence in disorders of the stomach; and where there are gastric complications it should prove a valuable agent. Chelidonium and chionanthus influence hepatic tissue, and may assist in eliminating the bile and overcoming to some extent jaundice.

The diet should be nourishing, easily digested, generally fluid in form, and taken in small quantities. Milk, koumiss, whey, broths, and gruels will give the best results, although fruits and the more succulent vegetables, sometimes, can be taken. Anodynes will have to be used where the suffering becomes intense.

SARCOMA OF THE LIVER.

Sarcoma of the liver very rarely occurs in the primary form. When it does, it is usually in the form of nodules of various sizes, distributed throughout the liver. They may arise from the interstitial connective tissue of the organ, or from the connective tissue of the blood-vessels and bile-ducts. They are most frequently found in young subjects.

Secondary sarcomata are more frequently found, the primary lesion being in the skin, eye, kidney, anus, or rectum. The liver is infiltrated or studded with brown or black nodules, and when a section is made, presents a mottled or granite-like appearance. In rare cases the liver is infiltrated with dark, granular material, there being no nodules. The growth is composed of small round cells, giant cells, and spindle cells.

The symptoms are similar to those of cancer, and are due to obstruction, gastro-intestinal disturbance, edema and ascites being the most pronounced. Progressive emaciation is characteristic, although cachexia is not present. The absence of cachexia, and the fact that it occurs more frequently in the young, may enable one occasionally to differentiate this from cancer, although usually the true nature of the disease is only determined during an autopsy.

The prognosis, like that of cancer, is always unfavorable, and the treatment only palliative and similar to that of carcinoma.

FIBROMATA.

These small growths are occasionally found during an autopsy, when not suspected during life. They may be located near the outer surface, or in the deeper tissues. They are yellowish in color, hard and resisting on making a section. The symptoms are negative, and consequently a diagnosis is impossible during life.

Cavernous angiomata occur but rarely, and vary from the size of a pea to that of a walnut. They occur more frequently in men than in women, and in the aged rather than in the young. The tumors are V-shaped, with their base to the surface of the liver beneath the capsule. They are small, reddish bodies, and consist of a series of dilated vessels.

There are no symptoms to suggest their presence; hence the diagnosis can not be made during life, save in rare cases where the tumorous mass becomes large enough to cause obstruction, and an exploratory incision reveals its true nature.

CYSTOMA.

These are found in the liver in two classes, simple and multiple cysts. The simple form are usually solitary, and represent malformation, and are generally congenital.

SUPPURATIVE CHOLANGEITIS.

This is rarer than the catarrhal form, and occurs more frequently in elderly people. It is a diffuse, purulent inflammation of the biliary passages, and usually results, in the aged, from gall-stones.

Etiology.—It is supposed to arise, in the majority of cases, from microbic infection, especially the bacillus coli communis, either alone, or combined with the staphylococcus albus or aureus, or with the streptococci. The ascarides may also enter the ducts from the bowel, and thus give rise to the disease.

Malignant growths of the ducts may also be responsible for the affection. The toxins developed during typhoid fever, dysentery, cholera, malaria, pneumonia, and puerperal fever may also be considered as factors in the disease.

Pathology.—The inflammation may be confined to the common duct, the cystic duct, or both ducts and gall-bladder may be involved. The mucous membrane is thickened, the ducts dilated and filled with a muco-purulent fluid. The walls of the ducts in some cases show extensive ulceration, which may be perforated and give rise to local peritonitis.

Symptoms.—Jaundice is present, although this may have preceded the suppurative form, and of itself is not a characteristic symptom. The patient will suffer with chills or rigors, followed by an irregular fever and night-sweats. The fever will assume a remittent or intermittent form. The patient shows marked emaciation, is enemic, and becomes greatly debilitated. Tenderness is marked in the hepatic region.

Complications are liable to arise, such as endocarditis, peritonitis, purulent meningitis, pyelephlebitis, septicemia, etc. There are digestive disturbances, such as nausea, vomiting, and diarrhea.

Diagnosis.—The form of the disease would be recognized by the symptoms characteristic of suppurative processes; viz., septic fever, night-sweats, and emaciation; the symptoms of peritonitis, pyelephlebitis, and abscess being present in a number of cases.

Prognosis.—This is a very grave disease, and the prognosis is unfavorable.

GALL-STONES.

Synonym.—Biliary Calculi; Cholelithiasis.

Definition.—Concretions, which form in the biliary passages or gall-bladder.

Etiology.—It is not definitely known as to the positive cause or causes that give rise to gall-stones. They are found within the hepatic duct and the gall-bladder, and rarely in the cystic

FIG. 27. GALL-STONES. (Musser.)

duct. They occur more frequently after the age of sixty, although they have been found in infancy and early life. According to Naunyn, they occur far more frequently in women than in men, about four to one, especially in women who have borne children. Tight lacing, sedentary habits, constipation, and fatty and starchy food also predispose to gall-stones.

The chief constituents of gall-stones are cholesterin and pigment-lime precipitated from the bile, as the result of the decomposition of such salts as hold them in solution. The more recent theory is that they are the result of micro-organisms. The fact that the gall-bladder is the habitat for the colon bacilli, strepto-

cocci, staphylococci, pneumococci, and the typhoid bacilli, and that gall-stones are frequently associated with the infectious fevers, and the experiment of Gilbert and Fournier, who produced gall-stones in animals by injecting micro-organisms into the gall-bladder, give weight to the theory.

Composition and Appearance.—Gall-stones vary in size and number, shape, color, formation, and consistency. They are composed of cholesterin bile-pigment, especially bilirubin, the lime-salts, and rarely phosphorus, magnesia, with occasional traces of iron and copper. Their consistency depends upon their constituents; thus, when made up of cholesterin and mucus, they are soft, and may be cut like wax, while those in which the lime-

FIG. 28. GALL-STONE IN
CYSTIC DUCT.
(Musser.)

FIG. 29. GALL-STONE IN
HEPATIC DUCT.
(Musser.)

salts are well represented are hard and brittle. The color varies from white, the cholesterin stones, to the yellow, dark-brown, or almost black, depending upon the amount of bile-pigment present.

There may be but one stone, or there may be thousands, Otto recording a case where there were seven thousand eight hundred and two stones in a single case. The fewer the stones the larger they become, and where only one exists it may attain a size of four or five inches in length. The single stone is usually found in the gall-bladder, while the smaller ones may be found anywhere in the biliary tract, even to the minutest bile-duct. The minute stones are sometimes called gall-sand, and no doubt the great number recorded by Otto were of this kind.

Their shape depends upon their consistency as well as number. When soft, they may be flattened, and when hard, they may contain facets when crowded together, others are oblong, oval,

or egg-shaped, depending upon pressure against each other. On section, the stone often shows a nucleus of cholesterin, the remainder being made up of concentric layers, the outer layers containing the various salts, being brown and hard.

The ducts, where the stone is located, may be dilated or saccular, and the mucous membrane smooth; or, if inflammation has been set up, it is thickened or ulcerated. In the latter case, adhesions to other parts take place. Perforation may occur into the peritoneal cavity or into other organs, and fistulous tracts may be established into the bowel, kidney, ureter, stomach, bronchi, or abdominal wall, the stones being discharged in this

FIG. 30. GALL-STONES IN
COMMON DUCT.
(Musser.)

way. Suppurative inflammation may result in any of the ducts where the calculi may be located, empyemia resulting.

Symptoms.—Gall-stones may be present for a long time in the gall-bladder, and finally pass out into the bowel without any symptoms, the presence of the stones in the stool being the first knowledge of there having been biliary calculi. A case of this kind came under my notice where the patient passed a handful of stones the size of filberts. Occasionally there will be an uneasy sensation in the right hypochondriac region, especially on change of position, when the stones remain in the gall-bladder; generally, however, the first evidence of hepatic calculi is when the stone starts on its journey for the bowel, and manifests itself in a sudden, intense, and lancinating pain in or near the region of the gall-bladder—*hepatic colic*.

The pain, beginning in the right hypochondrium or epigastrium, radiates in every direction, especially upwards in the right thorax, extending to the back and right shoulder. The attack occurs most frequently in the after part of the day or about midnight. It may last but a few minutes and cease, or for hours, days, and even weeks. As soon as the stone reaches the intestine the pain suddenly ceases. During the paroxysm of pain the patient may roll on the floor, flex the right limb, and grasp the abdominal wall for relief. The excruciating pain causes him to cry out with the suffering, the face becomes pallid, and frequently a cold sweat bathes the patient. Vomiting of bile is a common symptom.

The pulse is slow and feeble, or small and rapid. Rigors are often present, followed by fever, the temperature rising to 102° or 103° , and in rare cases going to 104° or 105° . The pain is intermittent in character, subsiding for a few minutes, only to appear with apparent redoubled force.

In from eight to twenty-four hours jaundice makes its appearance, although it does not occur in all cases. When the paroxysms have been unusually severe, the patient is completely exhausted at their termination, although the strength is rapidly renewed.

During an attack the liver is somewhat enlarged, and may be felt several inches below the costal line. There is tenderness in this region. In some cases there is enlargement of the spleen. Where the abdominal walls are thin, the presence of calculi can sometimes be determined by palpation.

Dropsy of the gall-bladder—*hydrop vesicæ felleæ*—may arise when the stone lodges in the cystic duct; giving rise to chronic obstruction.

Empyemia of the gall-bladder is a rare complication, the organ becoming greatly distended with pus.

In very rare cases, rupture of the duct occurs, followed by fatal peritonitis.

Diagnosis.—This is comparatively easy, the sudden paroxysms of pain in the epigastric region extending to the right shoulder, vomiting, great prostration, slow pulse, clammy skin, and jaundice, make a picture that can scarcely be mistaken for appendicitis, renal, or lead colic. The positive diagnosis is, of

course, made when the stone is passed in the stools, which should carefully be washed through a sieve.

Prognosis.—The prognosis of the individual attack is usually favorable, although death has occurred in a first paroxysm, where the vitality was low, the result of fatty heart. Cerebral hemorrhage, the result of an attack, has also proved fatal, while a local peritonitis, the result of perforation of the duct, has terminated fatally. Empyemia of the gall-bladder, attended by septic fever, carcinoma, and cardiac degeneration, render the prognosis very grave.

Treatment.—Our first object is to give relief to the excruciating pains of the distressed patient. This will be accomplished by inhalations of chloroform, and the hypodermic use of morphine. Most benefit will result from hot fomentations or the sitz-bath, or the old alcohol sweat. While the paroxysm is on, relief may be had by placing a napkin, moistened with chloroform, over the painful locality; but care must be used, and the cloth removed every few seconds, or the part will be burned.

Internally, large doses of dioscorea in hot water affords some relief; say dioscorea fifteen or twenty drops in a fourth of a cup of hot water every hour. The earlier Eclectics prescribed lobelia and asclepias in infusion, till diaphoresis and relaxation were fully established; although unpleasant, it is still good treatment.

As soon as the stone passes into the intestine, a full dose of antibilious physic and cream of tartar should be given, to remove, not only the calculi, but accumulated bile and fecal matter. Following an attack, remedies should carefully be selected to prevent further formations of the concretions, if possible.

Chionanthus, chelidonium, leptandrin, hydrastin, and podophyllin, as indicated, should be given for several weeks. The sodium salts should also be given freely. Olive-oil, an ounce, night and morning, is an old remedy, and may do some good. Sodium phosphate and podophyllin are not to be forgotten, as they are among our most reliable agents in this affection.

A very important part of the after treatment is the hygienic and dietetic. The patient should take regular exercise daily in the open air; horseback-riding is preferable, where the patient is able to profit by such advice.

The diet should be largely vegetarian, although lean meats

and fish may be allowed. All starchy and fatty foods, as well as sugar and pastries, should be avoided. Green vegetables, fruits, and skimmed milk, whey, or buttermilk should be the chief diet.

The bowels should never be allowed to become constipated, and if the soda salts are taken night and morning, there will be no danger from this source. Where the stone becomes permanently lodged and no relief from pain or soreness follows appropriate treatment, and when a septic fever with jaundice arises, which tells of pus in the gall-bladder, the case should be placed in the hands of the surgeon for operative treatment.

IX. DISEASES OF THE SPLEEN.

DISLOCATION OF THE SPLEEN.

Synonym.—Floating Spleen.

Definition.—The term dislocated spleen, is applied to the organ when, from some one or more of the various causes, it moves from its natural moorings, but remains fixed; while the term floating spleen is applied to a dislocated spleen that is movable.

Etiology.—The condition may be congenital or acquired. It may be due to an abnormal length, to stretching or tearing its ligaments by increased weight of the organ, by tight lacing, to traumatism, or to relaxation and stretching of the abdominal walls, so common in pregnant women.

Pathology.—The dislocated spleen has been found in various parts of the abdomen and pelvis, the most frequent place being the left iliac region, against the crest of the ilium; when in this position, the left flexure of the colon occupies the vacated space.

The spleen is generally greatly hypertrophied, especially when the displacement be due to engorgement from malaria or leukemia. Where there is impaired arterial circulation, the nutrition of the organ is deficient, giving rise to atrophy of the spleen, a rare condition.

Symptoms.—The symptoms are rather vague and are mostly due to pressure upon surrounding organs; thus where adhesions to the bladder or rectum have taken place, there will be tenesmus

of these parts. If the pressure be upon the spinal nerves at their point of exit from the spinal column, there will be perverted sensation and sometimes paralysis.

As the result of the dislocation, a coil of intestine may be compressed, giving rise to symptoms of ileus, or the same symptoms may result from the twisting of the pedicle of the spleen.

Diagnosis.—The diagnosis of floating spleen is determined by the absence of the organ from its natural position. This may be determined by percussion. If the organ be absent, a tympanic sound will be elicited from the left flexure of the colon, which has taken the place of the absent organ. To make it more positive, the colon should be filled with water, when *dullness* will be elicited, and, after allowing the water to run off, the tympanic sound returns.

Where the abdominal walls are thin and the spleen hypertrophied, the organ may be outlined in the left iliac region. The diagnosis, however, is difficult and many times is not made during life.

Prognosis.—As to cure unfavorable, though the life may be but little endangered. Should twisting of the pedicle occur, strangulation and necrosis may occur, resulting in death.

Treatment.—Where possible, the spleen is to be returned to its proper place, and a pad and bandage used, though it is extremely difficult to retain the organ in place by this method, and splenopexy may have to be resorted to in order to securely anchor it.

Where the dislocation has been due to malarial engorgement or hypertrophy, the after treatment will consist in relieving the congestion. For this purpose polymnia uvedalia will be used internally and locally. Of the specific tincture, one or two drams will be added to four ounces of water, and a teaspoonful given every three or four hours. As a local application we will use the uvedalia ointment, thoroughly rubbing it over the enlarged organ, and, with a flannel cloth spread over it, pass a smoothing iron over it as hot as can be borne.

Where splenopexy-fixation is a failure, splenectomy may be tried as a last resort. Of forty cases of splenectomy recorded by Vulpius, thirteen died, giving a mortality of thirty-two and a half per cent.

SPLENIC HYPEREMIA.

Acute or Active Hyperemia.—This may arise from the acute infectious diseases, the engorgement being known as the *acute splenic tumor*. It may be due to inflammation or trauma, and occasionally seen in amenorrhea. Except when due to injuries (circumscribed hyperemia), the organ is uniformly enlarged, is of a dark-red color and much softened. Cell infiltration may take place. The capsule presents the same characteristics.

Chronic or Passive Hyperemia.—This may precede hypertrophy due to malaria or some mechanical obstruction to the portal circulation like various growths, disease of the heart, liver, kidney, or lungs.

The spleen is increased in size, is of a dark-red color, firm in consistency, with a capsule partaking of the same characteristics.

Symptoms.—These may not be very pronounced, though a sense of fullness is experienced in the left hypochondriac region, with more or less tenderness on pressure. On palpation, the spleen is felt below the margin of the ribs. Percussion reveals increased dullness downwards and forwards in the left hypochondrium.

Prognosis.—This will depend upon the exciting cause.

Treatment.—This will be determined by the nature of the disease giving rise to the hyperemia. Where due to infection, the antiseptics will be most frequently indicated. If due to malaria, the antiperiodics, quinia and arsenic, will be important remedies as will the specific polymnia.

SPLENITIS.

Synonyms.—Acute Splenic Tumor ; Acute Hyperplasia of the Spleen.

Definition.—An inflammation of the parenchyma of the spleen.

Etiology.—Splenitis is now generally regarded as a secondary disease, the infectious diseases ranking first as causal factors, especially the following: Typhoid, typhus, relapsing, malarial, small-pox, pneumonia, pyemia, and endocarditis. It more rarely attends tonsillitis, pharyngitis, bronchitis, and similar inflamma-

tory diseases. By far the largest number of cases occur, however, from malaria, typhoid, and typhus fever, Collin having found it enlarged in every one of four hundred and ninety-one cases examined of malaria.

Pathology.—At first the spleen is simply hyperemic, red in color, of firm consistency, and the capsule more or less distended. "The malpighian bodies are usually obscure, and there may be visible areas of hemorrhagic extravasation. The size of the organ varies from a little beyond the normal to the extremest grades of hypertrophy, instances occurring in which it is four, six, or ten times the normal size and weight."

Microscopically, at this stage the blood-vessels are found over-distended, and the spaces within the splenic pulp contain masses of white and red blood corpuscles, and very soon degenerated erythrocytes in the form of fragments or of masses of pigment.

"In the later stages the spleen undergoes hyperplasia and degeneration, hemorrhagic extravasations are more abundant, and on microscopic examination, granular degeneration of the cells and fragmentation of the nuclei are observed, while large phagocytic cells containing pigment bodies or broken-down corpuscles may be abundant." (Stengle.)

Symptoms.—There are but few subjective symptoms, and in most cases they are indefinite or absent altogether. Should perisplenitis occur, pain and tenderness will be present. Where there is great enlargement, there will be a sense of weight and heaviness in the left hypochondrium. From involvement of the capsule or from pressure, vomiting sometimes occurs. Cough, dyspnea, and palpitations of the heart may also be present from pressure symptoms.

Physical Signs.—*Palpation.*—With the patient half reclining, and the thighs flexed, place the fingers of the left hand below the ribs and the outer angle, and with the right hand make firm pressure over the posterior portion, when the lower border of the spleen may be readily felt. If the patient be instructed to breathe slowly and deeply, with the mouth open, the organ can be much more readily outlined.

Percussion.—Increased dullness will be present, but great care must be exercised that we do not mistake a loaded colon or enlarged kidney for an enlarged spleen.

Diagnosis.—This is made chiefly by palpation, being really the only reliable information that can be obtained.

Prognosis.—Save in the very rare case where rupture occurs, the prognosis will be favorable, the disease subsiding with the disappearance of the primary disease.

Treatment.—Generally, no additional treatment will be needed to that used for the primary lesion giving rise to it. Echinacea and other antiseptics will have been given as the symptoms have indicated. In addition, polymnia may be used. Locally, if pain be present, libradol or antiphlogistin may be used.

SUPPURATIVE SPLENITIS.

Synonym.—Abscess of the Spleen.

Etiology.—This is due to infection from pyogenic micro-organisms, and may be introduced through an extension of a suppurative inflammation from a neighboring part, from the perforation of a gastric ulcer, from the lodgment of an infected thrombus, derived from an ulcerative endocarditis or other pyemic foci. It may also be due to the infectious fevers, especially typhoid, typhus, and relapsing fever. The micro-organisms may be introduced directly through a wound.

Pathology.—In most cases the abscesses are small and scattered throughout the organ, or there may be a single abscess varying in size from a walnut to one of enormous size, the degenerated organ appearing as an immense pus sac. The abscess may rupture into the stomach, the colon, the peritoneal cavity, or, perforating the diaphragm, empty into the pleura or lung.

Symptoms.—If the abscess be small and deeply seated, there may be an entire absence of symptoms; but where the abscess is very large, there will be pain in the affected organ, some tenderness, and more or less enlargement.

The irregular fever of septic conditions is present. Should the abscess rupture, the symptoms will depend upon where it empties,—into the peritoneum, colon, stomach, or, perforating the diaphragm, open into the pleura or lung.

Prognosis.—If the abscess be small, there may be but little danger, but when very large the case is grave and the prognosis must be guarded.

Treatment.—In the early stage, the use of the antiseptics will be called for; but when the abscess is large, and the irregular fever tells us of the presence of pus, the treatment is purely surgical.

CHRONIC INFLAMMATION OF THE SPLEEN.

Synonym.—Chronic Hypertrophy.

Etiology.—This may follow acute splenitis, when it is due to infectious agents. The most frequent cause, however, is malaria, though syphilis and tuberculosis are important factors. Obstruction of the portal circulation by various hepatic diseases is also a common cause of chronic enlargement.

Pathology.—The organ varies greatly as to size, sometimes assuming an enormous bulk, Morro reporting a case where the spleen weighed fifty-five pounds. The surface is generally smooth, dark-colored, and firm in character. A cut section reveals hyperplasia of the stroma and the presence of connective tissue. In other cases the organ is a soft, pulpy mass of degenerated cells. When due to malaria (ague-cake), the organ is of a mottled appearance, or of a dark-red or almost black color.

Symptoms.—Hypertrophy of the spleen may exist for a long time without any subjective symptoms, in fact, may never give the patient any discomfort. When very large, there is a sense of weight and oppression in the left hypochondrium, and if there are firm attachments to the diaphragm or stomach, dyspnea, palpitation, and nausea and vomiting may occur. Where there is much pressure on the vena cava there will be enlargement of the superficial veins of the legs and abdomen, accompanied by more or less dropsy. Pain and tenderness are sometimes a marked feature. Severe colicky pains may result from pressure upon the colon.

Treatment.—The treatment depends largely upon the lesions giving rise to it. When due to obstruction of the portal circulation, remedies will be directed to relieve this condition, podophyllin, leptandra, chionanthus, chelidonium, polymnia, and carduus marianus will be used. If due to syphilis, berberis, corydalis, and the iodides will be given. If the result of malaria, quinia, arsenic, and polymnia will not disappoint. Any agent that will

improve the general health—such as tonics, restoratives, etc.—may be administered.

SPLENIC INFARCTION.

Etiology.—This stands next to the kidney in the frequency with which embolism and infarction occur, it being found in from forty-five to fifty per cent of cases examined. The most frequent cause being ulcerative endocarditis; portions of the diseased valves or shreds of fibrinous deposits being carried into the circulation are deposited in the terminal arteries of the spleen.

Pathology.—There may be but a single infarct, though generally they are quite a number. In size they vary, sometimes being quite small, at other times involving the greater part of the organ. The infarct, which is wedge-shaped, has its apex towards the hilum and its base beneath the capsule.

At first the infarcts are of a dark-red color, quite hard, and resemble a hepatized lung; as the disease advances they grow lighter in color, and if the embolus be of an infective character, the infarct may undergo rapid softening, terminating in an abscess.

Symptoms.—Embolism may present little or no symptoms to call attention to the real condition. If, however, in the course of acute or chronic endocarditis the patient is seized with a chill, attended by pain in the left hypochondrium, the diagnosis would be quite certain.

Prognosis.—Where the infarcts are small, the prognosis is usually favorable.

Treatment.—The treatment would be along the line suggested for abscess of the spleen, and consists principally in the judicious selection of antiseptics.

X. DISEASES OF THE PANCREAS.

Since the pancreas is one of the most important glands concerned in metabolism, and since, by its secretion, all three groups of foodstuffs are changed into soluble absorbable substances, any pathological disturbance of the organ must necessarily be at-

tended by grave injury to the various vital functions of the body.

Yet, despite its importance, there is less clinical knowledge of this organ than any other of like importance, and, heretofore, to make a positive diagnosis of pancreatic lesions was seldom attempted. Much has been learned during the past ten years, however, through the investigations of Fitz, Scerim, Seitz, Nimier, Korte, and Mayo Robsen, the treatise of Korte and Robsen throwing much light on a hitherto dark subject.

Through the courtesy of W. B. Saunders, I shall quote freely from Dr. L. Osler's Monograph, "Diseases of the Pancreas," found in Nothnagel's "Encyclopedia of Practical Medicine."

HEMORRHAGE.

Etiology.—1. Diseases of the blood-vessels—atheroma, fatty degeneration, alteration of the vessel-walls from alcoholism, syphilis, etc.—are to be regarded as the most frequent cause.

2. Fatty degeneration of the gland-cells and excessive fatty infiltration of the pancreas.

3. Fat necrosis.

4. Hemorrhage in pancreatic cysts.

5. Hemorrhages from the disintegration of neoplasms.

6. Hemorrhage from embolism of the pancreatic artery.

7. Trauma.

Pathology.—"The pancreas is dark-red or violet; the meshes of the interstitial tissue are filled with fresh or altered blood; the acini dull gray, usually diffused with blood-pigment. The hemorrhagic masses extend also into the vicinity of the gland, and especially into the retroperitoneal connective tissue. Moreover the whole gland appears softened and friable." (Klebs.)

"The pancreas, as a rule, is enlarged, and only exceptionally is of normal size." (Draper.)

"The hemorrhage may affect the whole organ, or only part of it. In the most severe cases the tissue is completely disintegrated, a gangrenous, dark-red, discolored pulp displacing the pancreas." (Priner.)

Symptoms.—The disease may come on suddenly, while the patient is in apparently good health, by a sudden seizure of colicky pain in the upper part of the abdomen or lower left breast.

The pain soon becomes excruciating, and is attended by nausea and vomiting, which soon becomes obstinate, but without affording any relief.

The pulse is small, rapid, and feeble, the surface cold, which becomes clammy as the patient grows worse. There is a painful and extremely anxious countenance; the patient is restless, followed by great prostration, syncope, and death, which usually takes place in from thirty minutes to twenty-four hours.

Diagnosis.—When a patient, who has previously enjoyed good health, is suddenly seized with intense pain in the epigastric region, attended by uncontrollable vomiting and rapid collapse, we may suspect hemorrhage of the pancreas.

Prognosis.—This is almost always unfavorable.

Treatment.—Stimulants, such as the hypodermic injection of strychnia, camphor and ether, or a pint or two of warm salt solution, will bring about a reaction if it is at all possible. To relieve pain, morphia should be given hypodermically.

ACUTE PANCREATITIS.

Synonym.—Acute Hemorrhagic Pancreatitis.

Etiology.—The disease occurs far more frequently in men than in women, possibly owing to greater dissipation among the male sex, since alcoholism figures as a prominent factor in producing the disease. The most frequent cause, however, is an extension of inflammation from the duodenum to the pancreas, through Wirsung's duct. Glycosuria, gall-stones, trauma, acute tuberculosis, the infectious fevers, and hemorrhage, have each been credited as giving rise to pancreatitis.

Pathology.—The organ is enlarged, hyperemic, and deeply stained with blood, being of a reddish-brown or chocolate color. The gland may be firm and dense, or soft, pulpy, and friable. A cut section reveals a hemorrhagic infiltration of the interstitial tissue, the color being modified by fat tissues, which gives it a mottled appearance. "The infiltration may involve the peripancreatic tissue, the mesentery, mesocolon, omentum, and the subperitoneal fat tissue, as low as the brim of the pelvis." (Fitz.)

"The fat necrosis of Balser may also be seen as opaque white specks, spots, or streaks."

Symptoms.—Although there may have been a history of aggravated dyspepsia preceding the disease, the onset is usually sudden, unexpected, and violent. The intense, agonizing pain is located in the epigastrium or beneath the left breast, and radiates to the back and shoulder, or downwards, involving the entire abdomen.

Accompanying the pain, there is retching, or more frequently persistent vomiting, which consists of bile, mucus, or dark blood, or all combined. Great prostration, with symptoms of collapse, are early features of the disease. Constipation is the rule. Tympanites is not uncommon, with marked tenderness in the epigastrium.

There is usually but little fever, and at times the temperature is subnormal. The pulse is small, feeble, and rapid, dyspnea is marked, and occasionally delirium is present. Hiccough is often an unpleasant symptom. In fatal cases, death usually takes place within forty-eight or seventy-two hours.

Diagnosis.—This is made with difficulty, and may be mistaken for intestinal obstruction or acute perforating peritonitis. The sudden seizure of excruciating pain in the epigastric region, of one in good health, which is attended by persistent vomiting, circumscribed swelling, and tenderness in the region of the pancreas, and tender spots over the abdomen, with symptoms of collapse, would suggest pancreatitis.

The previous history would throw some light on the case, especially in differentiating between peritonitis and pancreatitis, and the vomit would be different if due to obstruction of the bowel.

Prognosis.—The disease generally terminates fatally, though recovery has taken place.

Treatment.—Our first effort will be made to relieve the pain. This will be accomplished by the hypodermic injection of morphia, and the local application of heat, or a cloth dampened with chloroform. Hypodermic injections of strychnia, camphor, and ether, or normal salt solution, will be used to prevent or overcome the symptoms of collapse. The subsequent treatment will be symptomatic, meeting the indications as they arise.

SUPPURATIVE PANCREATITIS.

Etiology.—The etiology is somewhat doubtful, though acute pancreatitis not terminating in death might be expected to result in the suppurative. Trauma, errors in diet, dissipation, and debauchery, are suggested as predisposing causes. An extension of infectious material from neighboring parts through the ducts would give rise to the suppurative form.

Pathology.—The organ is generally enlarged, and abscesses of various sizes may be found throughout the organ, or one large abscess may be found, with marked destruction of tissue. The suppurative process may extend to the peripancreatic tissue, or perforation into the stomach, duodenum, or peritoneum, may occur.

Fat necrosis is rare in suppurative pancreatitis; the spleen is but little enlarged, though abscess of the liver is not uncommon.

Symptoms.—The disease may be ushered in suddenly, as in the acute form, with intense pain in the epigastrium, vomiting, and more or less prostration. At the end of forty-eight or seventy-two hours, rigors occur, followed by fever of a septic type, and the tympanitic condition of the epigastrium may extend to the entire abdomen. Constipation may give way to diarrhea. Hiccough, followed by coma and death during the first week is the rule. Occasionally, however, the disease is prolonged for three or four weeks, the symptoms of septicopyemia being present, the patient finally dying of exhaustion.

Diagnosis.—The diagnosis is generally made, only post-mortem, though the sudden onset, with intense pain in the epigastric region, vomiting and prostration, followed by pronounced evidence of sepsis, would suggest the character of the disease.

Prognosis.—The disease almost invariably ends fatally. Should the diagnosis be made early, surgical interference might result favorably in a very few cases.

Treatment.—The treatment will be surgical and antiseptic. Echinacea would be an important remedy, though the sulphites, chlorates, and mineral acids would be indicated in many cases.

CHRONIC PANCREATITIS.

Owing to its association with diseases of the digestive apparatus and the insidious manner of its development, chronic fibrous pancreatitis is rarely ever diagnosed during life, hence it is of little clinical interest.

Etiology.—Among the causes giving rise to fibrous pancreatitis may be mentioned suppurative pancreatitis, terminating in induration; syphilis, especially when congenital; alcoholism; chronic inflammation of the pancreatic duct, frequently the result of extension of chronic gastro-duodenal catarrh; obstruction of the duct of Wirsung by pancreatic calculi; disease of the vessels, such as arterio-sclerosis or cardiac lesions, and from an extension of chronic peritonitis.

Pathology.—The characteristic feature of this variety is the thickening and fibrous transformation of the interstitial tissue, with the destruction or obliteration of the secreting glandular substance. The entire gland may be involved, or only a portion, especially the head. The gland may be greatly increased in size, being double the weight of the normal organ, or there may be a shrinkage of the newly formed fibrous tissue, giving rise to atrophy. In either case there is induration of the gland, which resists the knife like cartilage.

In color, the gland may be normal, although it is more apt to be yellow, or grayish white.

Symptoms.—There are no characteristic symptoms of chronic pancreatitis. For weeks or months, the symptoms are those of catarrhal gastritis, and consist of loss of appetite, nausea, belching, heartburn, or water-brash, and a sense of fullness or weight in the epigastrium. As these symptoms become more pronounced, emaciation, with its accompanying prostration, becomes a pronounced characteristic.

Pain, deep-seated and of a burning or boring character is experienced to the left of the epigastrium. Constipation, alternating with diarrhea, makes the bowels irregular. Ascites frequently occurs in the advanced stages, and jaundice is not uncommon.

A symptom that is regarded by some as characteristic is glycosuria. Enlargement of the spleen is not uncommon.

Diagnosis.—A positive diagnosis is only made post-mortem.

Prognosis.—This is necessarily grave as to a cure, although the patient may live for several years with a degenerated pancreas.

Treatment.—An important part of the treatment is dietetic. Since the pancreatic secretion is necessary to digestion of fats and starches, it naturally follows that this class of food should be restricted. Pancreatin administered after meals will be found useful. Phytolacca, iris versicolor, and Donovan's solution of arsenic will be found of some benefit.

The carbonated waters have been found useful in stimulating the secretion, and, if too much of the organ is not involved, will no doubt favorably influence the case.

CARCINOMA OF THE PANCREAS.

Etiology.—The disease occurs most frequently in men past forty years of age, although one case has been recorded in a child of two years, and in one at birth. While it may be primary, it is generally secondary. The primary cause is entirely unknown.

Pathology.—The scirrhus form is the one most commonly found, although the softer varieties are sometimes seen. The disease may be primary or secondary, usually the latter, and may involve any part of the organ, the head being the most common seat of the growth, which varies in size from that of a pigeon's egg to that of a child's head. Extension to adjacent organs frequently takes place, and adhesions to the stomach, colon, liver, intestine, spleen, gall-bladder, or peritoneum, are not uncommon.

Where the head of the pancreas is principally involved, the obliteration of Wirsung's duct may give rise to retention-cysts, or, by occluding the common bile-duct, the gall-bladder becomes distended with colorless fluid.

Symptoms.—The symptoms vary according to the stage of the disease, the portion involved, the extent of the metastasis, and pressure effects. It is difficult to separate the symptoms of one stage from the other; hence, the symptoms are not sufficiently pronounced to make them characteristic.

Disturbances of digestion are generally first noticed. The patient has noticed that he has been losing flesh and strength,

that the appetite is poor, and that there is distress after eating, a sense of fullness in the epigastrium, attended by heart-burn, eructation, nausea, and occasional vomiting. There is a deep-seated pain of a burning or boring character.

The patient becomes anemic, and has a cachectic appearance. The stools are greasy and sometimes bloody. A large amount of undigested muscular fibers in the stools, shows defective pancreatic digestion.

Where the head of the pancreas is chiefly involved, there is pressure upon the common bile-duct, with persistent jaundice. When the portal veins are compressed, ascites follows. The stools are very large, considering the amount of food taken, and should excite suspicion as to the nature of the disease. Should the inferior vena cava be compressed by the encroachment of the growth, dropsy of the lower extremities takes place, and should the intestine be involved, stenosis may follow, with irremediable constipation. The emaciation increases each day, cachexia becomes more pronounced, and the tumor mass may be felt through the thin abdominal walls.

The urine is generally albuminous, and glycosuria is not uncommon.

Diagnosis.—Where a patient presents rapid emaciation, persistent jaundice, deep-seated epigastric pain, a tumor mass, muscular fibers in the stools without diarrhea, fatty stools, and albumin and sugar in the urine, cancer of the pancreas is rightly suspected.

Prognosis.—Carcinoma of the pancreas, like that of any of the viscera, is necessarily fatal.

Treatment.—This is only palliative. Narcotics will be used to the extent of giving relief. The pancreatic preparations will be given in the hopes of aiding digestion. The food will be of the most nourishing character, and that which is easily assimilated. Itching of the skin is one of the most annoying features, and demands attention.

“Washing the skin with dilute vinegar, a teaspoonful to a quart of the decoction of the bran of almonds, or weak carbolic acid solution, one to two per cent, or rubbing with fresh lemon-peel, or spraying with from one per cent to two per cent of salicyl-alcohol, or one per cent of menthol alcohol, is beneficial.” (Osler.)

Washing with as much hot water as can be borne will sometimes give relief. Where the itching persists despite these precautions, morphia, hypodermically, should be used to obtain relief.

PANCREATIC CYST.

Etiology.—The generally accepted theory as to the cause of pancreatic cysts is, that they are due to retention of the gland secretion, the outflow being prevented in various ways; thus the obstruction of Wirsung's duct may be from without, and may be due to an extension of catarrhal condition of the duodenum, or to duodenal tumors compressing the duct, or the pressure may arise from gall-stones in the common duct. Most frequently, however, it is from within, and is caused by *chronic indurative pancreatitis*, which compresses and occludes the main duct and its branches.

Concretions may also obstruct the ducts so as to cause retention of their secretion. Dr. Senn, after a number of experiments in ligating the duct in various animals, failed to produce a cyst by thus obstructing the flow, and he therefore believes that the cysts are due, not so much to the retention of the secretion as to its non-absorption, either by an admixture of pathologic non-absorbable substances or by a lessened activity of the absorbing vessels. Trauma should also be mentioned as a cause.

Pathology.—"Cysts of the pancreas may be divided into two orders, monocyts and polycysts, and vary in size and shape, the single being much larger than the multiple. They range from the size of an egg to that of a child's head, or even larger, and may contain as much as twenty quarts of fluid. The cyst wall is composed of dense, firm, fibrous connective tissue, poor in cells. The lining of its walls is smooth, shiny, and free from epithelium.

"The contents of the cyst is a viscid or watery alkaline fluid of a grayish or reddish-yellow color, and with a specific gravity of 1010 to 1024. The fluid contains leucocytes, red blood-corpuscles, fatty degenerated epithelial cells, free fat, and crystals of fatty acids and cholesterin. The cystic fluid generally presents some or all the characteristics of pancreatic juice; viz., the power to emulsify fat, to transform starch into glucose, and to digest albumin and fibrin." (Fitz.)

Symptoms.—There may not be any symptoms preceding the appearance of the tumor, nor until it has reached considerable size, although usually there will be paroxysms of pain in the epigastrium or left chest, extending to the shoulder. Vomiting, belching, and diarrhea may attend these attacks. As the cysts increase in size, the patient loses flesh, and where the tumor is very large, emaciation is a marked feature. Fatty or greasy clay-colored and offensive stools, containing muscular fibers, are sometimes present. Very large cysts, owing to pressure on the liver, are accompanied sometimes by jaundice and ascites. Albumin and sugar, although not constant, were found in a number of cases.

Intestinal hemorrhage is not uncommon. When the tumor is very large, dyspnea occurs, due to pressure. The presence of the tumor mass is the most characteristic feature of a pancreatic cyst, and causes protrusion of the upper part of the abdomen, the enlargement being more to the left. The tumor is smooth, globular, resistant, not elastic, unless very large, and changing its position with the movements of the diaphragm. Fluctuation is readily obtained where the cyst contains large quantities of fluid.

Diagnosis.—This depends entirely upon the knowledge gained by physical examination.

The presence of a smooth, globular tumor in the epigastrium or left hypochondrium, with a resonant zone between the liver and spleen, would suggest pancreatic cyst. By inflating the stomach, the tumor is found behind and below this organ. On aspiration, an alkaline fluid is obtained that "emulsifies fat, saccharifies starch, and more rarely peptonizes albumin."

When the cysts are enormous in size, they might be mistaken for ovarian cysts; but the history of the latter disease, showing a gradual enlargement from below upward, would suggest the difference between the cysts.

Prognosis.—The success that has attended operative treatment renders the prognosis quite favorable.

Treatment.—This is distinctly surgical, and consists in draining the cyst, or in extirpation.

PANCREATIC CALCULI.

Concretions in the pancreatic duct occur so rarely that they attract but little interest to the clinician. Out of fifteen hundred autopsies at the Johns Hopkins Hospital, only two cases were found.

They consist principally of carbonate of lime, are grayish-white in color, round in form, and vary in size from that of a small bird-shot to that of a bean. They may be round and smooth, or rough, with prickly spines.

A catarrhal condition of the pancreatic duct, with retained secretion, is the only recognized factor in producing their formation. There is dilatation of the duct, and at times cystic formations, and, in still rarer cases, the formation of abscesses, as the result of the concretions. They may perforate into the stomach, colon, or duodenum.

Atrophy of the pancreas usually follows their presence, and cancer is often associated with them.

There are no characteristic symptoms to suggest their presence, and although there may be sharp, lancinating pains, they will be confused with those due to hepatic colic. The presence of fat in the stools, sugar in the urine, and pain in the left costal border rather than the right, would suggest calculi in the pancreas rather than in the liver.

The treatment would be surgical.

XI. DISEASES OF THE PERITONEUM.

ACUTE PERITONITIS.

Definition.—An acute inflammation of the peritoneum, either local or general.

ACUTE GENERAL PERITONITIS.

Etiology.—Though there are many possible causes giving rise to peritonitis, the most common and frequent mode of infection can be traced to one of two sources—gastro-intestinal, and the female genital organs.

Ulceration of the stomach or of the bowel, either due to typhoid fever, dysentery, appendicitis, intestinal obstruction or a high grade of enteritis, induces the disease.

A premature or a prolonged and difficult labor not infrequently leaves an infected genital tract, to be followed by metritis, endometritis, ovaritis, and peritonitis.

Disease of the bladder may also be responsible for this affection. Tubercular ulcerations and malignant affections not infrequently cause peritonitis, while abscesses of the liver, impaction of the hepatic ducts, nephritis, and splenitis are to be reckoned among the causes.

Penetrating wounds of the abdomen, or even surgical operations, open the way for the introduction of septic processes, and peritonitis follows. Pleuritis and endocarditis may give rise to the affection, through the lymph vessels of the diaphragm.

The micro-organisms most commonly associated with peritonitis are the streptococcus pyogenes, the bacillus coli communis, and the bacillus tuberculosis, though a number of others are found. Chronic irritants may give rise to the disease, as where a perverted bile irritates serous surfaces, or the toxins produced from the various bacteria. The disease may be primary or secondary, though rarely the former.

Pathology.—Peritonitis, like pleuritis or pericarditis, manifests a variety of conditions, depending upon the form or type of the inflammation, and may be either dry, plastic, or fibrinous, sero-fibrinous, sero-purulent, or hemorrhagic.

If the inflammation is diffuse, we find the parietal layer of the peritoneum, as well as the outer surfaces of the intestines, red, injected, and swollen, and the serous membrane clouded, due to the presence of a fibrinous exudate and to desquamation of the epithelium. As a result of this fibrinous exudate, adhesion takes place between coils of intestine, or between intestines and other viscera.

There is nearly always present more or less fluid in the abdominal cavity, which varies in character. It may be small in quantity and of a serous or sero-fibrinous character, though, if due to intestinal perforation or puerperal conditions, it is apt to be purulent in character.

Where the inflammation is severe and prolonged, the intestines share in the inflammation, with thickening of their walls.

In circumscribed or local peritonitis, adhesions limit the extent of the inflammation, and it is often known as adhesive peritonitis.

Symptoms.—Usually chilly sensations, or a marked rigor, announce the presence of peritonitis. At the same time the patient experiences severe abdominal pain; at first local, most frequently in the right side or in the pelvis, but it soon becomes general, involving the entire abdomen. The temperature rapidly reaches 103° , 104° , or 105° ; the pulse is small, frequent, and wiry, varying from 120 to 160 beats per minute. The respiration is shallow, hurried, and restricted to the thorax—thoracic breathing.

The tongue, at first white and pasty, soon becomes dry, and of a red or brown color. Hiccough is a common and distressing symptom. The position of the patient in bed is characteristic; he lies on his back, with his limbs flexed to relieve abdominal tension. The abdomen is exquisitely sensitive, and often the weight of the bedclothes causes much suffering.

The abdomen is distended and drummy, sometimes enormously. Any movement of the body, such as coughing, sneezing, or even a full respiration, increases the sufferings of the patient.

Nausea and vomiting is an early symptom, the latter causing great pain. In the early stage of the disease, diarrhea is a frequent symptom, but soon gives way to obstinate constipation. Micturition is frequent, the urine being scanty and high-colored.

The appearance of the face is somewhat characteristic. There is an anxious look, the nose is pinched, the eyes somewhat sunken, and the nose and ears are inclined to be cool.

There is seldom delirium, save in the advanced stages, and occurs mostly in fatal cases, and in these it soon gives way to stupor, and finally coma.

Physical Signs.—*Inspection* reveals a marked distension of the abdomen, and *palpation* shows the abdomen rigid and extremely sensitive to the touch.

Percussion causes much suffering, and reveals marked tympany, the liver and spinal dullness being obliterated. If there be much effusion of fluid, there will be dullness in the most dependent portion of the abdomen, unless the gaseous distention be excessive, when the pressure of fluid may be hard to detect.

In fatal cases, the surface temperature usually drops, though, if the temperature be taken by rectum or vagina, it is very high;

the respiration becomes feeble and shallow, the pulse small and thready; the patient sinks into a profound stupor, to be soon followed by death.

Where the attack is due to a perforation, the first symptoms are generally those of collapse, to be followed by those already mentioned.

Diagnosis.—This is not usually difficult. The *continuous* pain and tenderness of the abdomen, the marked distention, the marked increase in temperature, the frequent, wiry pulse, shallow, thoracic respiration, hiccough, nausea, and vomiting, diarrhea, followed by constipation, the characteristic pinched and anxious expression, and symptoms of collapse, are pathognomonic, while a physical examination confirms the above, and relieves any doubt that may have existed.

Prognosis.—Acute general peritonitis is an extremely grave disease, and the prognosis should be very guarded. Death may occur within forty-eight or seventy-two hours, and most fatal cases within ten days. Great abdominal distention, with extreme tenderness, shallow, hurried breathing, small, wiry pulse, pinched features, and coldness of surface, suggest an unfavorable termination.

Treatment.—Although a grave disease, careful medication will succeed in restoring a good per cent of our cases. If we remember that we have an inflammation of serous tissues not unlike pleurisy or pericarditis, the treatment will be more successful.

Select the appropriate sedative,—*veratrum* if the pulse be full and strong, a rare case; or *aconite* where the pulse is small and rapid. To these we add the indicated remedy. The sharp, lancinating pain will call for *bryonia* as in pleurisy. Abdominal soreness will call for *dioscorea*. The wiry pulse, with inability to sleep, calls for *rhus tox.* Where the patient is restless, and there is cerebro-spinal irritation, gelsemium in full doses is an excellent remedy. Colocynth must not be forgotten for the sharp, spasmodic pain.

If the tongue be dry, red, or brown, with sordes on the teeth, hydrochloric acid will give the most satisfactory results; but where the tongue is moist and dirty, sodium sulphite will be the better remedy. For bad odors, potassium chlorate has no supe-

rior. If there be marked nausea and vomiting, small bits of ice in the mouth, or a little mint-water and bismuth, will frequently overcome it.

The abdomen will be so sensitive that only light-weight applications will be allowed. Cloths wrung out of hot or cold water should be given a trial; in most cases, the hot will give greater relief. Some cases will be benefited by the local use of lard and turpentine. One of the *best* of local applications is *libradol*. It not only possesses anodyne properties, but is a relaxant as well.

A fresh application should be made every twenty-four hours. If the disease is due to puerperal conditions, uterine irrigation will be highly beneficial, if too much force be not used. Do not elevate the fountain higher than is necessary to allow the fluid to flow into the womb and out again. A weak solution of potassium permanganate will give good results.

Enemas of normal salt solution will be helpful. Where the distention of the bowel is excessive, tincture prickly-ash berries, two drams; turpentine, fifteen drops; and water four ounces, will be a good enema.

Albumen water or sherry whey, given in small quantities, is usually well received by the stomach. Where nourishment can not be taken by mouth peptonized milk and small quantities of salt solution should be given per rectum.

ACUTE LOCAL PERITONITIS.

The inflammatory condition may be confined to a portion covering a single organ or part, and is then known as local peritonitis. Thus we have pelvic peritonitis, due usually to diseases of the female genital organs, such as of the uterus, ovaries, or tubes. The causes leading up to this condition may be tubercular, gonorrheal or puerperal.

The symptoms are more of a local character, though there is necessarily some systemic disturbance. Thus the pain is local, and there is functional disturbance of the organ involved; at the same time the appetite is impaired, the tongue is furred, there is a slight elevation of temperature, though the fever is irregular and hectic in character.

Peritonitis, due to appendicitis, has been considered under the head of inflammation of the appendix.

Subphrenic peritonitis, is the term applied when the disease is located near the diaphragm, is due to gastric ulceration, diseases of the liver, duodenum, or spleen.

The location of the pain directs the attention to the part or parts involved, and makes the diagnosis comparatively easy.

The treatment is not unlike that for general peritonitis, libradol or turpentine stupes, as local measures, while internally the individual remedy will be used. Should there be pus present, surgical measures are to be resorted to.

CHRONIC PERITONITIS.

Definition.—Chronic inflammation of the peritoneum.

Etiology.—This form usually follows one or more attacks of acute peritonitis, the causes of which have been named under the acute form. Less frequently it may occur without a previous attack, especially where there is a malignant, tubercular, or rheumatic diathesis.

Pathology.—*Adhesive Peritonitis.*—This usually follows the acute attack, the peritoneal layers frequently becoming inseparably glued together and very much thickened, while coils of intestine become attached to each other and to neighboring parts.

Proliferative Peritonitis.—In this variety there are few or no adhesions, but marked thickening of the peritoneum. This is apt to be associated with cirrhosis of the liver, stomach, or kidneys, and not infrequently is due to chronic alcoholism. Thickening of the omentum may sometimes give rise to a thick, hard cord or band running transversely across the upper part of the abdomen.

There may be effusion varying in character and quantity, and occupying the abdominal cavity at large, or confined to pockets due to adhesion.

Hemorrhagic Peritonitis.—Virchow first described this form of peritonitis, in which a new membrane of connective tissue covers the peritoneum, and in which extravasation of blood occurs from the newly developed open blood-vessels. It may follow frequent wounding of the peritoneum by paracentesis.

Chronic Tuberculous Peritonitis.—The thickening of the layers of the peritoneum, to all appearance, are similar to those

forms already described; but on examination with the microscope, tubercular degeneration is found.

Localized peritonitis results in firm, fibrous adhesions, and is usually preceded by inflammation of some spinal part.

Symptoms.—Chronic peritonitis always develops insidiously, the symptoms in the earlier stages being more or less obscure, and of little clinical significance. Disorders of digestion are always present to some extent, and where adhesions restrict the common duct or portal vein, jaundice or ascites, or both, will be present.

Constipation is a common condition, save in tubercular peritonitis, when diarrhea prevails. There is nearly always pain or uneasiness in some portion of the abdomen.

The fever is of an irregular type, the tongue is furred, the face assumes an anxious or pinched look, emaciation follows, and there is nervous disturbances.

The abdomen is generally prominent, either distended with gas or effusion, frequently both are present.

Percussion reveals dullness, where ascitic fluid is present, or where adhesions are firm and thick; and resonance, where gas is present. Not infrequently a hard band can be outlined across the upper part of the abdomen, a roll of omentum being responsible for this condition.

Diagnosis.—A history of the case shows a former attack of acute peritonitis, or a gradual impairment of health, with disturbance of digestion and more or less abdominal pain. A physical examination generally reveals the true condition.

Prognosis.—When the disease is of long standing, with adhesions and thick fibrous bands, together with profuse effusion, the prognosis is unfavorable; but if seen in the early stages, and the environments of the patient are good, a favorable result may be anticipated.

Treatment.—In the treatment of chronic peritonitis, bryonia, colocynth, and dioscorea should be given a thorough trial. Bryonia stimulates the absorption of the inflammatory products, and also acts as a pain-reliever. The sharp colicky pain is benefited by colocynth, and soreness calls for dioscorea.

Iodide of arsenic, first trituration, will also be found useful. The chlorates and mineral acids will have their special indications. Where there is ascites, the distillate of apocynum will

prove useful. Locally, much benefit will follow the use of the thapsia plaster.

The diet should be selected so as to avoid gas formation; sweets and excessively starchy foods should be discarded, and also coarse vegetables. The sanitary conditions should be the best, and, when possible, a change of climate often proves highly beneficial. Some cases will require the surgeon.

ASCITES.

Synonyms.—Dropsy of the Peritoneum; Abdominal Dropsy.

Definition.—An accumulation of serous fluid in the peritoneal cavity.

Etiology.—Any obstruction of the portal circulation is a possible cause of ascites, the most frequent being cirrhosis of the liver. Pressure from tumors or neighboring organs may also give rise to it. Peritonitis and valvular heart disease is also responsible for ascites, and chronic pulmonary affections may impair the portal circulation to the extent of producing it.

Pronounced anemia, as seen in malarial cachexia, purpura, chlorosis, Bright's disease, etc., also give rise to ascites.

Chylous ascites is due to an exudation from the lacteals, the result of malignant infiltration.

Tuberculosis of the peritoneum is also a factor in ascites. In rare instances, the fluid becomes milky in character, due to the presence of fat and not to the presence of chyle.

Pathology.—The peritoneum may be thinner than normal, and opaque; or it may simply present a blanched appearance, and some cases show little if any changes.

The quality and character of the fluid show great variation, from a few pints to several gallons, and from a straw or lemon tint to a brownish or greenish hue. It may be blood-stained, and occasionally clean and transparent. It is usually watery in character, and though it may be viscid, is generally alkaline, with a specific gravity of from 1010 to 1015, and is rich in albumin.

Symptoms.—There is a sense of fullness or weight in the abdomen, increasing as the fluid increases. There is a distressed feeling, rather than pain. With an increase in the ascitic fluid,

the liver is crowded upward and to the right, as well as the heart and lungs. This crowding upward of the diaphragm gives rise to more or less dyspnea, and the patient soon finds himself unable to lie down. Gastric disturbances are common, and constipation is the rule. Micturition is frequent, though the quantity voided is small and high-colored. General emaciation may be marked, notwithstanding the enlarged abdomen.

Physical Signs.—*Inspection* reveals the abdomen uniformly distended, when the patient assumes the upright position, but when lying down there is bulging in the flanks and the upper part of the belly is flat. The skin is smooth, tense, and shiny, often presenting a waxy appearance. The superficial veins are generally distended.

Respiration is hurried and principally thoracic; the thorax is widened at the base, but appears much shorter than in health.

Percussion reveals dullness over the most dependent parts, and resonance at the upper portion; a change of position will give dullness wherever the fluid gravitates.

On placing the left hand flat upon one side of the abdomen, and striking the opposite side with the fingers, the fluctuating fluid is readily felt, and is a chief diagnostic symptom.

Diagnosis.—This is readily made by inspection, palpation, and percussion. We differentiate from ovarian cysts by the uniformity of the enlargement in ascites. In ovarian cysts, except those of enormous size, the enlargement is irregular, and there is nearly always a history of menstrual derangement, with an absence of cardiac or palpitating disturbances; while in ascites, there is usually a history of a disturbed liver, kidney, or heart.

Prognosis.—This depends largely upon the cause and length of time the disease has existed.

Treatment.—In the use of diuretics and cathartics we must be careful in our selection, and not cause too great a depression or exhaustion. Fortunately our *Materia Medica* is rich in efficient vegetable diuretics, and a judicious selection will bring most gratifying results.

Apocynum.—This is a veritable Samson in the treatment of dropsy. Where the urine is scanty and high-colored, and the bowels are constipated, and where the heart's action is feeble, apocynum has no superior. Of the specific tincture, from fifteen

to thirty drops are to be placed in four ounces of water, and a teaspoonful of this will be given every hour. If the system does not respond to the specific tincture, do not discard the remedy, but administer the distillate of apocynum (apocandle) in from thirty to sixty drop doses every three or four hours. Should the kidney and bowels fail to respond to this, then administer the decoction made with the ground root. This last form is the most efficient way to administer this valuable agent, but, unfortunately, it is so nauseating that many can not take enough of the remedy to get the best results. Of the decoction, we begin with five drops, gradually increasing the size of the dose until we reach the limit of toleration, which is usually thirty or forty drops.

Apis is also a good remedy where there is smarting or burning sensation in voiding water.

Aralia Hispida.—This is another valuable diuretic, and should not be overlooked in ascites. The best results are obtained from the infusion. It should be given every two or three hours.

Polytrichum Juniperum.—As a hydragogue diuretic, this is one of the best remedies and should be given in infusion.

Chimaphila is another good vegetable diuretic, and, like the remedies already mentioned, should be used as an infusion, if the specific tincture fails to give the desired results.

Strophanthus frequently accomplishes more than any other remedy, thirty drops to a half glass of water, a teaspoonful every hour.

Sometimes the system fails to respond to these excellent agents, and we think of the compound powder of jalap and the bitartrate of potassium, in dram doses every three, four, or five hours, until we get two, three, or four copious stools in twenty-four hours.

Elaterium in one-sixth or one-eighth grain doses, combined with potassium bitartrate, is also an efficient combination.

Sometimes there is such an enormous distention of the abdomen by the effused fluid, that the absorbents are unable to do their work till the pressure is taken off by tapping. After withdrawing the fluid, the same remedies that before were ineffective, now give good results.

Where the dropsy is due to malarial cachexia or splenic disturbances, appropriate remedies should be administered for the specific conditions.

Tonics and alteratives may also be necessary.

In some cases repeated tapplings will be necessary, and for this operation the patient should assume the upright position, and the trocar made to enter the median line, midway between the bladder and the umbilicus, the bladder having previously been emptied.

PART V.

DISEASES OF THE URINARY SYSTEM.

I. DISEASES OF THE KIDNEY.

MOVABLE KIDNEY.

Synonyms.—Floating Kidney; Dislocated Kidney; Wandering Kidney; Renal Mobilis.

Definition.—A condition where the kidney is released from its moorings of fat, peritoneum, and blood-vessels, and occupies an abnormal position. Various terms are used to designate this condition according to the degree of displacement; thus a palpable kidney is one where the lower edge of the organ can be felt only on deep pressure. A movable kidney is one where the displacement is sufficient to enable one, by firm pressure, to pass the fingers over the upper end of the organ during deep inspiration; while a floating kidney has the field at large.

Etiology.—This condition may be congenital, though usually acquired. It is found more frequently in women than in men, and the right is the one most frequently affected, owing to its position beneath the liver, as with each inspiration the organ is depressed. Tight lacing favors its dislodgment, while repeated pregnancies give rise to relaxation of the abdominal walls. Tumors may also crowd the organ from its natural position. Resorption or wasting of the perirenal fat also favors this condition. In men, heavy lifting or trauma may give rise to it. It is not uncommon in neurasthenics. Drummond believed that in a majority of cases there was a congenital relaxation of the peritoneal attachments.

Symptoms.—There may or there may not be any subjective symptoms. In the former case, the discovery is made during an examination for some lesion foreign to the kidney, or discovered during an autopsy. The most common symptom is a dull, dragging pain in the loins and abdomen, being more prominent on the affected side. With this are associated symptoms of neurasthenia and hysteria, generally reflex, and due to pressure upon some organ or part. Or the patient, discovering a tumor, allows his imagination to run riot; cancer is his diagnosis, and a legion of nervous symptoms follow.

Dyspeptic symptoms are quite common.

A twisting of the renal vessels, or strangulation or compression of the kidney, give rise to severe attacks of abdominal pain, vomiting, chills and fever, and frequently attended by collapse. These attacks are known as Diehl's crisis.

Palpitation of the heart is a common symptom with floating kidney. There are so many symptoms due to reflex conditions, that the patient's life is made miserable, not so much from the kidney direct as from the nervous derangement.

The physical signs of movable kidney are the most important evidences in the diagnosis of the lesion and are determined by palpation, percussion, and inspection, which gives the only reliable information. In examining the patient we have him lie on his back with the abdomen relaxed. Place the left hand under the lumbar region, and with the right manipulate the abdomen from above downwards. During the manipulation, if no positive results are reached, have the patient take a full inspiration, when the kidney may be outlined. In thin subjects the tumor mass (kidney), can be readily felt, though rarely can it be grasped in the hand.

Diagnosis.—By careful observance of the physical signs just mentioned the diagnosis is comparatively easy, though gallstones may be taken for a movable kidney; here, however, there is marked jaundice, which is nearly always absent in movable kidney. Abdominal tumors of various kinds are sometimes confusing, but a careful manipulation will generally enable the physician to tell the one from the other.

Prognosis.—Unless complications occur, life is never endangered, and many times a cure may be effected by proper band-

aging, the use of pads, rest in bed, attention to diet, and finally by surgical measures.

Treatment.—The treatment for misplaced kidney consists of mechanical, dietetic, and surgical measures, medical treatment being only used to allay reflex disturbances, and give relief when the patient is suffering pain.

Anders suggests that, since emaciation and resorption of perirenal fat is a cause of wandering kidney, the restoration of these will assist in a cure, and advises rest in bed and a diet that is fat-producing. While this may be true theoretically, it is not likely to effect a cure very often. After replacing the kidney, the patient should lie in a recumbent position for a few weeks, and before leaving the bed, a firm binder, with pad should be applied. The bowels should be kept in a soluble condition to avoid severe straining at stool, and the patient should be cautioned against any severe physical exertion. A snug abdominal support may assist in the cure by holding up the intestines, thus acting as a support.

Should these measures fail, nephrorrhaphy, or stitching the kidney in place till adhesions fix it permanently, must be a final resort. After the operation the patient is to keep his bed for several weeks, to prevent the sutured organ giving way. Should this surgical measure fail, nephrectomy or extirpation is the final measure, though this should be avoided where possible, for the history of successful nephrectomies is not very brilliant.

CIRCULATORY DISORDERS OF THE KIDNEYS.

ACTIVE HYPEREMIA.

Synonyms.—Acute or Active Congestion of the Kidney.

Definition.—A temporary congestion of the blood-vessels of the kidneys, attended with little or no exudation.

Etiology.—Acute congestion is caused by the presence of irritants in the blood, either in the form of toxins, which are found in all the infectious as well as some of the other fevers, or by the ingestion of certain drugs, such as turpentine, potassium chlorate, carbolic acid and cantharides, *santonin*, *copaiba*, squills, and many others.

Severe injuries to various parts of the body may also give rise to congestion, while severe surgical operations, especially those on the bladder and urethra, or laparotomies, are frequently attended by acute congestion. The removal of one kidney is apt to be followed by congestion of its fellow. Sudden chilling of the body is a very common cause. The simple operation of introducing a catheter into a sensitive urethra may be followed by acute hyperemia of the kidney.

Pathology.—The kidney is swollen, soft, dark-red in color, and if a section is made, the blood flows freely. In very severe congestion, the microscope will reveal cloudy swelling of the cortical substance.

Symptoms.—There is a sense of weight and oppression, rather than acute pain, in the lumbar region. The urine is scanty and, in some cases of poisoning, is almost suppressed. It is of a dark-red color, contains blood-corpuscles, some albumin, and, in severe cases, tube-casts. There may be slight elevation of temperature and an increased pulse-rate.

Diagnosis.—The diagnosis is readily made. Oppression in the lumbar region, scanty and highly colored urine, with normal or but slightly elevated temperature, can hardly be mistaken for any other condition.

Prognosis.—The prognosis is always favorable, save where the result of some major surgical operation.

Treatment.—The old alcohol sweat or spirit vapor-bath is an excellent measure at the beginning of an attack. Continue the bath until there is copious perspiration, when the patient is to be carefully covered in bed and given an infusion of couch grass (*triticum repens*), haircap moss, or marshmallow. Usually aconite and gelsemium is all that is needed:

℞	Aconite	gtt.v.
	Gelsemium	gtt.xx.
	Water	℥iv. M.
	Sig. Teaspoonful every hour.		

Apis in drop doses is also a valuable remedy. If the bowels be constipated, a full dose of antibilious physic will greatly assist the specific in overcoming the acute congestion.

PASSIVE HYPEREMIA.

Synonym.—Chronic or Passive Congestion.

Definition.—A chronic engorgement of the renal vessels, which is usually secondary to congestion of the other viscera.

Etiology.—The most frequent causes giving rise to renal congestion are chronic cardiac diseases, especially the advanced stage of valvular lesion after compensation gives way, and chronic pulmonary lesions, such as emphysema, adhesive pleuritis, fibroid phthisis, etc.; also chronic disease of the liver, such as chronic hepatitis and the various degenerations. It may arise from pressure upon the renal veins, from a gravid uterus, ascitic fluid, or tumors.

Pathology.—There is enlargement of the kidneys, which are dark-red in color, and firm and resisting to the touch. The capsule is but feebly attached or non-adherent. On making a section, the medullary substance is seen to be darker in color than the cortex, has a coarse, fibrous appearance, and bleeds freely; the Malpighian bodies appear as dark-red points, and are more prominent than under normal conditions. The most constant and characteristic lesion is the thickening of the walls of the capillaries both glomerular and medullary. Where the congestion continues for a long time, the appearance of the kidneys change; the enlarged organ, owing to disturbed nutrition, atrophies, and we have the "contracted kidney of congestion."

Symptoms.—"The urine is diminished in quantity, the color is darker than normal, the reaction is strongly acid, and the specific gravity rises to 1,025 to 1,030, because the watery portion diminishes more than the other urinary constituents. Owing to the diminution of the percentage of water, the urates show a tendency to precipitate as the specimen cools, and form the well-known brickdust sediment (*sedimentum lateritius*), which is readily dissolved by heating to body temperature, by neutralizing or rendering the urine alkaline, and appears under the microscope as amorphous, golden-yellow granules, which occur either isolated or collected into cylindrical irregular masses. In addition to the pigment, which gives the sediment its brick-red or pink color (uroerythrin, urinary pink), the urine may on account of the accompanying hepatic congestion, contain bile pigment, especially urobilin, less frequently bilirubin." (Senator.)

There is weight in the loins, and the patient complains of backache. Gastric disturbance is common, and in long standing cases edema of the extremities follow. Accompanying these symptoms are those of the primary lesion, which may be cardiac, respiratory, or hepatic.

Diagnosis.—The scanty, highly colored urine, with but little albumin and few casts, enables us to recognize it from nephritis, the only disease with which it could be confounded.

Prognosis.—The prognosis will depend altogether upon the primary lesion and our ability to remove it. Chronic congestion may terminate in chronic nephritis.

Treatment.—An infusion of apocynum will be a good heart-tonic as well as diuretic, and is an agent that can hardly be dispensed with in the treatment of chronic congestion with cardiac complications. An infusion of digitalis is also a good remedy with the same conditions present. Cactus and cratægus will also be found useful. Should the liver be involved such remedies as leptandra, chionanthus, chelidonium, carduus marianus, polymnia, and agents of like character, may be used as indicated.

The bowels should be kept soluble, but we should avoid depleting cathartics. The diet should be nourishing, easily digested, and contain meat at least once per day. Fruits should be eaten freely.

ANOMALIES OF THE URINARY SECRETION.

ANURIA.

Definition.—Total Suppression of Urine.

Etiology.—Some cases of intense congestion in acute nephritis are attended, for a time, by complete suppression of the urine, though generally there is only partial arrest of the secretion.

Blocking of the ureters by renal calculi may also give rise to suppression.

Shock following major surgical operations and sometimes the catheterization of a patient may give rise to this condition. During the collapsed stage of cholera and yellow fever, no urine is secreted. Hysteria may be an exciting cause, Charcot report-

ing a case where no urine was secreted for eleven days, and Bailey cites a case of a girl who passed no water from December 12th to March 1st, or during a period of fifty days. In the latter case, the physician was undoubtedly deceived.

Symptoms.—These depend largely upon the cause of the suppression and the length of time involved. If due to mechanical obstructions, there may be but little systemic disturbance or discomfort for some time. At other times, there is evidence of uremic poisoning very early, the first symptom being that of irritability, to be soon followed by twitching of the muscles, nausea, vomiting, convulsions, and a profound coma.

Diagnosis.—Is made by the use of the catheter, no urine being present in the bladder. The skin is cool and the temperature often subnormal.

Prognosis.—This will depend upon the cause giving rise to it.

Treatment.—Where the suppression is due to mechanical obstruction, surgical measures will be the only method of relief. To establish the secretion, give the patient a spirit vapor-bath, and after profuse perspiration and complete relaxation, place the patient in bed, with hot applications to loins and feet, and administer gelsemium in five-drop doses in hot water. In extreme cases, wet cups to the back will bring relief. If gelsemium does not establish secretion, give an infusion of marshmallows, haircap moss, or triticum repens. The old compound tincture of Virginia snakeroot, given in hot water, is a very good agent.

Pilocarpin.—Where the skin is dry and the pulse *full and bounding*, one-eighth or even one-fourth grain of pilocarpin, used subcutaneously, will prove the quickest and most efficient remedy. Pilocarpin causes the system to relax quicker than almost any other agent, and as an eliminator of morbid material, has few equals.

Strophanthus.—This is an excellent remedy where the suppression is due to cardiac lesions. One or two drams to four ounces of water, of which a teaspoonful should be given every hour.

Hydragogue cathartics may be given freely, and their full effects afford relief to the congested kidney.

HEMATURIA.

Definition.—The presence of blood in the urine.

Etiology.—Hemorrhage from the kidney may be caused by severe acute or chronic hyperemia of the kidney, from nephritis and embolic infarctions due to ulcerative endocarditis. Malignant disease of the kidney, or tuberculosis of the organ, will also give rise to it, while the ingestion of large doses of turpentine, cantharides, and potassium chlorate, carbolic acid, and like remedies, is followed by hemorrhage. Injuries or blows over the kidneys are sometimes attended by severe bleeding. Stone in the ureter or bladder, or the passage of a small calculus through the urethra, may be the exciting cause. A severe cystitis is sometimes attended by hemorrhage. Certain diseases, like malaria and leukemia, may be attended by blood in the urine.

Some cases occur from unaccountable causes, and may be termed renal hemophilia. I have an interesting case, a "bleeder"—hemophilia—who bleeds from the slightest provocation, most frequently from the nose or gums, though on three different occasions the hemorrhage has been from the kidneys.

Symptoms.—There is a sense of fullness and weight in the loins, and sometimes pain of a dull, aching character. There is almost a constant desire to micturate, attended with tenesmus and burning. If the result of an injury, the pain may be intense and of a sickening character, with marked prostration. The pain may extend down the ureter to the penis or testicle.

Diagnosis.—The diagnosis is easily made as to the presence of blood in the urine, but it is not always easy to tell its source.

The color of the urine will vary from a smoky hue to a dark coffee color, and between which there may be every shade of red. The microscope will reveal the presence of red blood-corpuscles thus distinguishing it from hemoglobinuria, in which they are entirely absent. If the hemorrhage be from the kidney, the blood is apt to be more uniformly mixed with the urine, and there will often be cylindrical clots the shape of the ureter or mold of the kidney. If from the bladder, the first urine voided may be quite clear, or at least much lighter than the last portion. When the quantity of blood is very slight, the

color may not be deep enough to reveal it, and reagents will have to be used to determine its presence.

At times the clotted blood may completely fill the bladder. If there be doubt as to the source of the hemorrhage a cystoscopic examination of the bladder, and catheterization of each ureter, will determine the location, and remove all doubt.

Prognosis.—This will depend entirely upon the cause: where the result of grave lesions, the prognosis will be unfavorable.

Treatment.—In acute hematuria, the patient should be placed in bed, a towel wrung out of cold water applied around the abdomen, the patient being warmly covered with blankets, and hot-water bottles placed to the feet. Internally, five-grain doses of gallic acid may be given every thirty or sixty minutes, or we may give five drops each of the oil erigeron and cinnamon, every ten, twenty or thirty minutes. Where the hemorrhage is more passive in character, hamamelis, hydrastis, or *carbo vegetabilis* may be given. Ergot should be given hypodermically in extreme cases. Should the heart's action be strong, as shown by the full, bounding pulse, *veratrum* should be administered.

Where the hemorrhage is due to congestion of the kidney or nephritis, means should be directed to overcoming these conditions, and such remedies as *gelsemium*, *apis*, *eryngium*, and *rhus tox.* will be useful. Also infusion of couch grass, marsh-mallows, haircap moss, and remedies of like character.

HEMOGLOBINURIA.

Hemoglobinuria is the result of the destruction of the red blood-corpuscles, whereby the coloring matter is set free and eliminated by the kidneys, the coloring matter being found in the urine.

Etiology.—The destruction of these blood-cells is nearly always due to the presence of some toxin; either some one of the many toxic drugs, such as turpentine, carbolic acid, potassium chlorate, phosphorus, arseniuretted hydrogen; or of the infectious fevers, as typhoid, typhus, yellow fever, scarlet fever, diphtheria, malaria, syphilis, and all cachectic conditions, and those generated during metabolic changes. It may be due to

the ingestion of certain fungi, as false mushrooms or tainted food of any kind, or from the ptomains developed in milk, cheese, canned goods, etc.

Paroxysmal Hemoglobinuria.—This form is very rare, and consists of the occasional passage of blood urine, in which only the coloring matter is present. While the cause is not known, it seems closely associated with the tendency to cold in sensitive people. It has also been associated with Raynaud's disease.

Pathology.—The pathology of the disease is unknown.

Symptoms.—The attack may come on suddenly, with chilly sensations, followed by febrile reaction, though in some cases the temperature may be subnormal. It generally follows exposure to cold, and is of short duration, usually subsiding within twenty-four or forty-eight hours. During the paroxysm, there may be vomiting and diarrhea, with pain in the lumbar region.

Diagnosis.—This can only be made by a microscopical and chemical examination of the urine. The urine has a red, brownish-red, or black color, and deposits a heavy sediment of the same color. The microscope reveals the absence of blood-corpuscles and the presence of granules or castlike formations, and sometimes crystals.

Prognosis.—It is generally favorable, though in malignant malarial hemoglobinuria fatal results may follow.

Treatment.—This will depend upon the causes giving rise to the disease. Rest in bed is necessary in all cases. Gallic acid, ergot, and the mineral acids should be tried. Erigeron and cinnamon must not be overlooked.

ALBUMINURIA.

Definition.—The presence of albumin in the urine.

Etiology.—The terms albuminuria and Bright's disease were used synonymously for a number of years, and to detect albumin in the urine was proof sufficient for a diagnosis of nephritis.

It is now recognized, however, that there are several conditions other than nephritis giving rise to albuminuria, several of which are innocent, provided they are not persistent.

The presence of albumin in the urine, in all probability,

indicates some change, however slight and transient, in the epithelium of the glomeruli or the capillaries of the tuft, which permits the escape of the normal constituents, serum-albumin and serum-globulin, from the vessels into the renal tubules.

The principal causes giving rise to albuminuria are acute, and chronic congestion of the kidneys, acute and chronic nephritis, the various degenerations of the kidneys, the toxin of scarlet fever, diphtheria, typhoid fever, measles, influenza, and numerous infectious diseases, certain blood changes that occur as the result of arsenic poisoning and poisoning from other minerals, and of certain diseases, such as scurvy, leukemia, syphilis, and others of like character. Pregnancy and certain lesions of the nervous system, as epileptic seizures, apoplexy, etc., may also be attended by albuminuria. We may divide albuminuria, for convenience, into functional and structural, eliminating from the latter those cases not due to nephritis.

Paroxysmal or Cyclic Albuminuria.—This variety is characterized by a regular rise and fall in the quantity of albumin during the twenty-four hours. Usually the amount is small, with but few if any casts.

The albumin appears shortly after rising in the morning, gradually increases during the day, grows less on lying down, and disappears during the night, to reappear the following morning.

The quantity varies according to the mental or physical exertion of the patient, and the character and quality of the food taken.

It occurs mostly in young men whose general health has become impaired. These patients are generally emaciated, lose flesh and strength, suffer with headache and general languor, disorders of the stomach and bowels, and are inclined to be hysterical. Where these conditions have existed for some time, it is often quite difficult to diagnose the functional from the structural form.

Dietetic Albuminuria is that form where albumin appears in the urine after the ingestion of certain articles of food, notably eggs, cheese, and pastry, or any full meal, especially where digestion is faulty or where severe exertion takes place immediately after a meal. The quantity is usually small, with but few and only temporary casts.

Neurotic Albuminuria is that form which follows periods of great emotional excitement, hysteria, and severe mental strain. Epileptic seizures, apoplexy, tetanus, and injuries of the head, also give rise to it.

Albuminuria Following Exertion.—This is due to congestion of the kidneys, and appears after severe or prolonged exertion. It is often found in the urine of athletes after contests of running, rowing, or any of the various contests where prolonged strength is required. The quantity is usually small, and disappears after a few hours of rest, to return again when the same conditions again appear.

The Blood Changes, as seen in syphilis, lead, mercury, and arsenic poisoning, severe anemia and puerperal eclampsia, when not due to nephritis, give rise to albuminuria.

Febrile Albuminuria.—The various febrile and inflammatory diseases may give rise to slight albuminuria. The presence of albumin in the urine is due to some change in the epithelium of the glomeruli, caused by the toxins of the fever, and although there is a cloudy swelling, there is no structural change.

This may accompany diphtheria, typhoid fever, the eruptive fevers, tonsillitis, and like diseases.

While these various forms of albuminuria are not regarded as serious, yet if persistent, they should be regarded unfavorably, as they usually lead to structural changes.

Diagnosis.—The diagnosis of albuminuria is made by finding albumin in the urine, by one of the several tests described. The differential diagnosis, however, will require a more careful study. In renal or structural albuminuria, the quantity is persistent, usually large, and contains a larger per cent of tubercasts. There are also symptoms of dropsy, cardiac derangement, and more or less anemia.

In functional albuminuria, the quantity is small, with but few casts, and is not constant.

Tests for Albumin.—The urine to be tested should be free from any morphologic constituents, and should therefore always be filtered. Care should be taken that it be free from leucorrhœal and menstrual discharges. Two samples should be taken; one before breakfast and after a night's rest, the other at the close of the day.

1. *Boiling Test.*—This is the most common, easy, and reliable

test for albumin. Fill a test-tube about one-third full of urine; if neutral or alkaline, add one or two drops of acetic or nitric acid. Hold the tube slanting, that the heat may strike the upper portion of the urine, and bring to a boiling point. If albumin or the phosphates be present, the upper portion becomes turbid, which is clearly shown against the clear urine in the bottom of the tube. Then add a few drops of nitric acid, which will thicken the turbidity if albumin be present, and clear it if it be absent.

2. *Heller's Nitric-Acid Test.*—This requires a little more care in the test, and is no more reliable. It is as follows: put a little nitric acid into the test-tube, and then carefully pour a little urine down the side of the tube; as it comes in contact with the acid, a white ring is formed at the point of contact. Uric acid, urates, and certain coloring matters, form a pink or red zone, which is just above the junction of the two liquids. Hemialbumose will give the same white zone, but does not respond to the boiling test as does serum-albumin.

3. *Johnson's Picric-Acid Test.*—Place a little urine in a test-tube, and carefully place a few drops of a saturated watery solution of picric acid upon the top of the urine; if albumin be present, a turbidity or white zone immediately forms at point of junction. Heating strengthens the evidence already manifest.

4. *Ferrocyanid-of-Potassium and Acetic-Acid Test.*—Fill a test-tube one-third full of urine, and add a few drops potassium-ferrocyanid solution. After thoroughly mixing the urine and the reagent, add ten to fifteen drops of acetic acid. If albumin be present, a cloudiness more or less pronounced takes place, depending upon the amount of albumin present. As this precipitates all forms of albumin, either acid or alkaline, and does not precipitate mucin peptones, phosphates, urates, vegetable alkaloids, or the pine acids, it becomes a very reliable test.

5. *Magnesium Nitric Test.*—To five volumes of the saturated solution of sulphate of magnesium add one volume of strong nitric acid. Fill a test-tube one-third full of this solution, and with a pipette allow the urine to flow down the side of the tube; at the point of contact a cloudy ring will form.

6. *Quantitative Test.*—To determine the proportion of albumin per thousand, Esbach's albuminometer will be used. This

tube bears two marks: one, U, indicating the point to which the urine must be added; and one, R, the point to which the reagent is added. The lower portion of the tube up to U bears a scale reading from one to seven. The tube is filled to U with filtered albuminous urine, and the reagent added till the point R is reached. The tube is then closed with a stopper, inverted twelve times, and set aside for twenty-four hours. At the expiration of this time serum-albumin, serum-globulin, and albuminose, as well as uric acid and creatinin, will have settled down, when the amount per mille, in grams, may be directly read off from the scale. The solution used is composed of ten grams of picric acid and twenty grams of citric acid dissolved in 1,000 c. c. of distilled water. (Simon.)

Prognosis.—This depends entirely upon the cause and length of time that albumin has been found in the urine. Albuminuria due to fever and hemic changes is nearly always transient, and disappears with the subsidence of the fever.

If the patient be a young man, and there is no increased arterial tension, the albumin may disappear spontaneously after a few months' time. Occurring in a patient past forty years of age, with increased arterial tension, it would indicate a more serious kidney lesion.

In cyclic and dietetic albuminuria the prognosis is generally favorable. In all cases of persistent albuminuria, however, there is in all probability glomerular changes that are apt to lead to structural changes. If the kidneys are affected, and there be increased arterial tension, and tube-casts be present, the prognosis must be guarded, and if the patient be an applicant for insurance, his application should be refused.

Treatment.—The treatment is largely dietetic and hygienic. The patient should eat sparingly of meats and eggs, the principal diet consisting of vegetables, fruits and milk. Exercise in the open air, short of weariness should be taken and no severe work, either mental or physical allowed. Drop doses of Howe's acid solution of iron, when an acid is indicated by the red tongue, will give favorable results.

PYURIA.

Definition.—Pus in the urine.

Etiology.—Pus may arise from an abnormal condition of

some part of the urinary tract, or it may break into it at any point and be discharged with the urine.

Pyelitis and Pyelo-Nephritis.—Calculi, tuberculosis, or other sources of irritation may give rise to inflammation of the pelvis, pus flowing with transitional epithelium. Where the pus is due to an abscess, it may be intermittent, days or weeks intervening, when the urine is free. When due to a calculus or tuberculosis, it is usually constant. In these cases the mixture of urine and pus is acid, but where the pyelitis and pyelo-nephritis follow cystitis, the urine is alkaline, contains more or less mucus, and is thick and gelatinous. In such cases the symptoms of bladder trouble are generally pronounced.

Cystitis.—When due to cystitis, the pus is peculiarly offensive, is thick, stringy, tenacious, contains mucus, and is alkaline in reaction. The pus and urine are so thoroughly mixed, that, when due to pyelo-nephritis, the triple phosphates are frequently present. The stringy mucus generally passes with the last portion of the urine.

Urethritis.—When due to urethritis, there is generally the history of gonorrhea, the quantity is small and passes ahead of the urine.

Leucorrhea.—As in gonorrhea, the quantity is usually small and mixed with large flakes of vaginal epithelium. Where there is any doubt as to the source, the urine should be drawn with a catheter.

Rupture of Abscesses into the Urinary Passages.—In these cases there are generally symptoms of an abscess at some part, either in the kidney or right iliac fossa—suppurative appendicitis. This form is usually accompanied by a sudden discharge of a large quantity of pus in the urine. It may be but for a short time and disappears as suddenly as it came, or gradually grows less, several days passing before there is a complete subsidence of pus.

Diagnosis.—We diagnose pus in the urine by the greenish, yellow, or yellowish-white tinge, the thick, ropy, tenacious character of the urine due to mucus, the ammoniacal odor, and generally alkaline reaction; by the presence of pus corpuscles, or leukocytes, as determined by the microscope. Phosphatic urine somewhat resembles pus in the urine, though in such cases

the sediment is more white and the microscope at once reveals the difference.

Potassium-Hydroxide Test.—"Permit the urine to settle. Decant the clear liquid, and add to the sediment a solution of potassium hydroxid-caustic potash. If pus be present, a gelatinous mass results; if pus is found in the sediment, albumin may be expected in the clear liquid previously decanted."

Treatment.—This will depend somewhat upon the location of the pus-producing part. Thus, if of the bladder or urethra, the treatment will be quite different from abscess of the kidney.

We are to remember that pus in the kidney does not materially differ from pus in any other organ, and the remedies used for pus in the urine will be the same as those for suppurative processes wherever found,—such remedies as calcium sulphide, echinacea, baptisia, sodium sulphate, potassium chlorate, and the mineral acids as they may be severally indicated. The bowels should be kept soluble, with an occasional hydragogue cathartic, to flush the system and rest the kidney. The skin should be kept moist with an occasional dose of jaborandi or pilocarpin. Uva ursi, either tincture or infusion, will be found to give good results, and should be taken freely and continued for a long time.

The diet should be nourishing, easily digested, and fluids should be restricted to the smallest amount compatible with health.

If the pyuria be due to cystitis, irrigation of the bladder with a boracic acid solution or a weak solution of potassium chlorate with phosphate of hydrastin, should be used. Specific agrimony, elaterium, cantharidis, red onion, cocklebur, triticum repens, verbascum, chimaphila, and helonius are indigenous remedies, and will prove of great benefit.

CHYLURIA.

Definition.—Chyle in the urine.

Etiology.—This very rare and interesting condition in temperate regions is due to lymphatic connection with the urinary passage. In the tropics it is due to parasitic origin and caused

by rupture of the renal lymph vessels, which become obstructed and weakened by the *filaria sanguinis hominis*.

Symptoms.—There are no subjective symptoms. The urine has a milky appearance. If there is a large amount of chyle present, the fat particles rise to the top, forming a pellicle on the surface, while the fibrin settles to the bottom, forming clots. If ether be added to the urine, and the mass agitated, the fatty particles give way, the urine becoming clear. Since the chyle contains serum-albumin, it will respond to the same tests for that substance.

Microscopic examination reveals myriads of small, bright, round granules, similar to those of milk, which will dissolve in ether.

Diagnosis.—This is made by the milky appearance and the condition of the urine already noted.

Prognosis.—This is unfavorable as to a permanent cure, and though the urine may be clear for a time, yet, after a varying interval, new lymphatics rupture, and the urine again shows the milky appearance.

Treatment.—As yet no satisfactory treatment has been found for chyluria. Such dietetic and hygienic measures should be used as will add tone to the general health. Change of climate may, by adding new vigor, bring about a cure.

GLYCOSURIA.

Definition.—The presence of sugar, glucose, in the urine.

Etiology.—There are quite a number of causes that give rise to glycosuria. The first, and by far the most serious, is diabetes mellitus, and when due to this cause it is generally permanent. Intermittent and paroxysmal glycosuria may arise from gout, the eruptive fevers, cholera, malaria, hepatic cirrhosis, and organic diseases of the nervous system, especially diseases of the medulla.

Great mental emotion or shock may also be followed by glycosuria, as also may injuries of the brain. Pregnancy may be a cause. Gibier, of New York, has demonstrated on dogs, and proven that certain toxic drugs give rise to this condition;

Morphia, atropia, chloral, hydrocyanic acid, and alcohol being a few of the many that produce such a result.

Diseases of the pancreas may also give rise to it. Obesity may be responsible for temporary glycosuria, while the ingestion of large quantities of food rich in saccharine or starchy substances, and beer, give rise to what is known as dietetic glycosuria.

Diagnosis.—The urine is increased to fifty or sixty ounces per day, is clear, of a pale yellow color, and of high specific gravity, 1.025 or more. It has a ripe-fruit odor, and an acid reaction. The finding of sugar or glucose by one of the following tests, makes the diagnosis positive:

1. *Fehling's Test.*—This test is made by using Fehling's solution which consists of two parts,—a copper solution, and a soda solution. Since a solution made according to the original formula soon decomposes on standing, and since the solution is too concentrated to obtain a delicate reaction, I give the following modification of Fehling's solution, taken from Ogden's work on clinical examination of the urine. This is not only a permanent solution, but at the same time furnishes a rapid and yet delicate reaction.

The solution is divided into two parts; viz., copper solution (A), and alkaline tartrate solution (B).

(A) Cupric sulphate, 34.639 grams; distilled water, ad-1,000 c. c.

(B) Sodio-potassium tartrate (Rochelle salt), 173 grams; sodio-hydrate (specific gravity 1.120)', 500 c. c.; distilled water, ad-1,000 c. c.

These solutions, A and B, are to be kept in separate bottles and in a dark place. Equal parts of the two solutions produce diluted Fehling's solution.

Process.—“Place equal parts of the two solutions, A and B—about one finger breadth of each—in a test-tube, and boil. If the Fehling's solution remains clear on boiling, then add twenty to thirty drops of the suspected urine which is free from albumin.

Do not boil after the addition of the urine.—If much sugar be present, a yellow or red precipitate of suboxid of copper readily appears. In case the quantity of the sugar in the urine is less than one per cent. the reduction will not appear until after several minutes, five to thirty. If a reduction does not take

place in thirty minutes, it is advisable to let the test stand for from eighteen to twenty-four hours, since traces of sugar show evidence of a reduction of the copper only after several hours, when a small amount of the suboxid will be found in the bottom of the test-tube. Less time is required for the test, if the urine is gently heated previously to its being added to the boiling Fehling's solution. The non-appearance of a suboxid precipitate shows that the urine is free from sugar. Fehling's test, performed in this way, is one of the most delicate and reliable of tests.

2. *Trommer's Test*.—To a dram of urine in a test-tube add a few drops of a dilute sulphate of copper solution, and then add one dram of liquor potassæ, bring this to the boiling point, and, if sugar be present, the copper is reduced, forming the yellow or orange-red suboxid.

3. *Bottger's Test*.—This test, to be of any value, must have any albumin that may be present removed, which may be accomplished by rendering it acid, boil and filter; to this filtered urine add from one-half to an equal quantity of liquor potassæ, and a few grains of bismuth subnitrate. Boil for several minutes, and, if glucose be present, black metallic bismuth will be precipitated.

Prognosis.—This will depend altogether upon the cause. In diabetes mellitus, the prognosis will be grave, while in most of the paroxysmal and intermittent forms, the glycosuria disappears with the removal of the cause.

Treatment.—The treatment for glycosuria due to diabetes mellitus will be considered under a separate article.

In the temporary form, the treatment will be largely hygienic and dietetic. The patient should be placed on veal, mutton, fish, or chicken, with very little bread. Fruits, except lemons, currants, sour cherries, plums, and the acid fruits, and all saccharine substances, should be avoided. He should avoid all worry, lead an even, temperate life, and be out of doors as much as possible. With improved health, the glycosuria disappears.

From the good report of *rhus aromatica* in diabetes mellitus, we would prescribe the remedy here with all confidence, bearing in mind, however that with the disappearance of the exciting cause, the sugar also disappears.

OXALURIA.

Definition.—The continued presence of an excess of calcium oxalate in the urine.

Etiology.—Oxalic acid is found in small quantities, a mere trace, in normal urine, and in still larger quantities, transient oxaluria, after eating certain fruits and vegetables; such as apples, pears, tomatoes, rhubarb, asparagus, cauliflower, spinach, beans, sorrel, etc. It is found in hypochondriasis, diabetes mellitus, catarrhal icterus, neurasthenia, gout, tuberculosis, and cancer. It is supposed to be due to disordered metabolism, especially of the fats and carbo-hydrates.

Symptoms.—"The symptoms of oxaluria are those of greatly depressed vitality. The appetite is irregular, and digestion imperfect, with well-marked dyspeptic symptoms. The secretions are deranged, the skin being very susceptible to external impressions, at times dry and harsh, again soft and flabby and covered with an unnatural perspiration; the bowels are usually torpid and sluggish and do not respond well to the action of medicine. The patient is low-spirited and melancholy, the temper is irritable, and there is great restlessness, and constant brooding over his condition. There is frequently a very disagreeable impression of weight and pain in the loins and small of the back; the urine is voided with increased frequency, and with more or less heat and scalding.

"The patient becomes greatly emaciated as the disorder advances, and frequently sinks into a state of confirmed hypochondriasis. If the disease goes thus far, some other part of the system becomes the seat of the disease, as the lungs, liver, bowels, etc., which carries the patient off."

Diagnosis.—The specific gravity of urine in oxaluria is usually from 1,020 to 1,030, and, as before remarked, in many cases it contains an excess of uric acid and urates, urate of ammonia being deposited on cooling, and sometimes tinted with purpurin.

The deposit of oxalate of lime occurs in the form of white, glistening powder, which, when examined under the microscope, is found to consist of transparent octahedra, with sharply defined edges and angles. The best way of making the examination is to allow a portion of the urine, passed a few hours after

a meal, to stand until cool, then decant the major portion, and pour a part of the remainder into a watch-glass, when, on applying heat, the crystals of oxalate will be collected at the bottom.

Oxalic calculi are next in frequency to the uric; they are generally of a dark-brown color, rough and tuberculated, hard, compact, and perfectly laminated. It is insoluble in the alkalies, dissolves slowly in nitric and hydrochloric acid, if previously well broken up, and under the blowpipe expands and effloresces into a white powder. A variety of this species is remarkably smooth, and of small size, and from its shape has been described under the name of "*hemp-seed*."

Prognosis.—Is generally favorable.

Treatment.—"In the treatment of oxaluria, the most prominent indications are, to improve the general health, and to establish secretion from the other emunctories. As there is a condition of confirmed dyspepsia, this must be managed as heretofore named. I might here remark that I have found the strong infusion of peach-bark given in quantities of two teaspoonfuls every three hours, and also the tincture of collinsonia in half-teaspoonful doses four times a day, very successful remedies in these cases. I frequently order the triple phosphate of quinine, strychnia, and iron (compound tonic mixture) in half-teaspoonful doses two or three times a day. It should be given with water, as much as half a wine-glassful at every dose. The colorless fluid hydrastis fits some cases well, in doses of half a teaspoonful. The hydrastis is a very efficient agent in some of these cases, as is also the ptelea, populus and liriodendron. These remedies should in all cases be associated with the mineral acids, the nitric being recommended by Dr. Prout, but a combination of one part nitric and two or three of hydrochloric, by others.

"If there is a tenderness on pressure over the epigastrium, I would strongly recommend the irritating plaster. To overcome constipation of the bowels where it exists, we may employ the podophyllin pill, named under the head of uric acid, or the powder of sulphur and phosphate of soda, named in preceding pages. The diet should be regulated with the greatest care, all agents that produce flatulence or acidity of the stomach being discarded, animal and vegetable food being used in about equal proportions. The same means to increase elimination from the

skin, as in the case of uric acids, should be employed here, and especially should flannel be worn next to the skin, and warm clothing, to protect the body against sudden changes in temperature. In many cases, all drinks but water will have to be excluded, and especially should wine, beer, and other stimulants be proscribed: a small portion of brandy being allowed if absolutely necessary."

INDICANURIA.

Definition.—The presence in the urine of an abnormal quantity of indican. It occurs in small quantities in health.

Etiology.—"Indican is formed from indol,— C_8H_7N ,—which is a product of the putrefaction of albuminous substances in the intestine. The indol is then absorbed from the intestines and enters the blood, where it becomes oxidized to indoxyl,— C_8H_5NO .—which immediately combines with potassium (and, to a slight extent, with sodium), sulphate to form indoxyl-potassium sulphate, in which form it is eliminated in the urine." (Ogden.)

All disorders, therefore, in which large quantities of albumin are decomposed, must be considered as causal factors in indicanuria. Such as carcinoma of the stomach, ilius, and all wasting diseases; cachexia, empyema, putrid bronchitis and gangrene of the lungs may be regarded as primary factors in giving rise to this condition.

Diagnosis.—This is made by using one of several tests, and demonstrating the presence of indican in the urine.

Tests for Indican.—Stokvis' modification of Jaffé's test is one frequently employed, and is as follows: place a few c. c. of urine in a test-tube; add an equal volume of concentrated hydrochloric acid, and two or three drops of a strong solution of sodium, or calcium hypochlorite. The mixture is shaken with one or two c. c. of chloroform. The indigo blue that follows reveals the presence of indican.

Take 15 c. c. of strong hydrochloric acid (C. P.), in a wine-glass, add one or two drops of strong nitric acid (C. P.), stir; then add thirty drops of the urine to be tested, and stir immediately. An amethyst color soon makes its appearance, reaching its greatest intensity in from five to twenty minutes.

If *normal*, a distinct but not intense amethyst color appears; if *increased*, the color is decided, and often very deep. (Ogden.)

PHOSPHATURIA.

Definition.—The persistent presence in the urine of an excess of the phosphates.

Etiology.—“A considerable quantity of phosphoric acid is excreted from the blood through the kidneys in health, usually divided between four bases, soda, ammonia, lime, and magnesia, all of which are either soluble themselves, or rendered so by the presence of some acid, the presence of a very minute portion being sufficient for this purpose.

“It may also be deposited in a healthy condition of the system, as after eating, laborious exercise, and especially after severe mental labor; but the deposit continues for only a short time; where continuously deposited, it is always indicative of important functional, and sometimes organic, disease. Dr. Bird remarks that one general law appears to govern the pathological development of these deposits; viz., that they always exist simultaneously with a depressed state of nervous energy, often general, more rarely local in its seat. Of the former, the result of wear and tear of body and mind in old people; and of the latter, the effects of local injury to the spine, will serve as examples. “Three forms of phosphatic deposit may be named: the *triple phosphate*, *phosphate of lime*, or calcareous deposit, and the *mixed deposit*, a combination of the two preceding. The first is always associated with dyspepsia, the digestive functions being poorly performed, the patient irritable and restless, with loss of flesh and strength, so that he is fatigued by slight exertion. The urine is usually copious, of a light amber color; or in some cases it is dark, and of a high specific gravity, 1.025 or 1.030. The deposit of phosphate of lime occurs from urine secreted in large quantity, of low specific gravity, and readily decomposed by the atmosphere. The mixed deposit usually occurs combined with a large quantity of mucus, the urine being pale, fetid, and depositing a thick, mortar-like sediment on standing. It usually occurs in cases of injury or severe diseases of the spine, organic disease of the kidneys and bladder, in the severe forms of dyspepsia, and in persons who have

been exhausted by severe mental labor, anxiety, night-watching, and during the progress of cachectic affection that debilitates the system. The symptoms are those of imperfect digestion, mal-assimilation and mal-nutrition, and disordered innervation.

"Deposits of the phosphates are always white, unless colored with blood, are insoluble in ammonia or liquor potassæ, but soluble in dilute hydrochloric acid. In a majority of cases, urine depositing much of the phosphates is alkaline, though they are deposited when it gives an acid reaction with litmus paper; but in this case the acidity does not depend upon free acid, but upon neutral salts. These deposits often settle to the bottom, like a thick cloud of mucus, for which it is frequently mistaken; we may at once detect their true nature, however, by the addition of hydrochloric acid, which dissolves the phosphates, but does not affect the mucus. When examined by the microscope, the triple phosphates present beautiful crystals, of the form of triangular prisms, small stellate concretions, and penniform crystals. The phosphate of lime does not occur in crystals, but occasionally in irregular, crystallized masses. Calculi of phosphate of lime are not of frequent occurrence, but it sometimes forms alternate layers with other matter. When it occurs it is usually small, of a pale-brown color, of a loosely laminated structure, not fusible with the blowpipe, but readily soluble in hydrochloric acid without effervescence. The ammoniaco-magnesian calculus is of a white color and friable, looking a good deal like a mass of chalk; it exhales an ammoniacal odor before the blowpipe, is not affected by caustic potash, but is easily dissolved in dilute acids. Another form of phosphatic calculi has been denominated fusible; it is white, extremely brittle, easily separated into layers, and leaves a white dust on the fingers. It is not affected by caustic potash, is soluble in hydrochloric acid, and is melted into a transparent pearly glass under the blowpipe. Both of these last forms often attain an immense size, and frequently form incrustations on foreign bodies."

Treatment.—"The general treatment will be somewhat similar to the other forms. The bitter tonics and iron, to improve the digestion and the quality of the blood, should be steadily employed. In some cases there seems to be such a loss of tone on the part of the stomach that tonics have no effect; in such

cases I direct an emetic two or three times a week, with the happiest results. As in the case of oxaluria I have obtained most excellent results from the use of nux vomica and strychnia, and the collinsonia and agrimonia, quinine, to the extent of from two to eight grains a day, is often of marked benefit.

"The urine should be kept acid to prevent a deposit, and for this purpose dilute nitric acid is most frequently used. The bowels should be kept in a soluble condition, as heretofore named, and strict attention given to the skin, and its secretions favored by the use of the bath, friction, and wearing flannel and warm clothing. The diet should be carefully selected, plain but generous, and, to the considerable extent, of animal food." (Scudder.)

UREMIA.

Definition.—A toxemia occurring in the course of various diseases, generally those of the kidneys, and due to a retention in the blood of certain products that are usually removed by these organs. It is not yet positively determined whether these retained products are the normal constituents of the urine or the results of some derangement in the process of metabolism.

Although most common in nephritis, uremia is found as a result of, or accompanying, other diseases; notably, typhus, typhoid, diphtheria, scarlet fever, gout, cholera, yellow fever, etc.

Etiology.—Brown-Sequard believed uremia to be due to a disturbance of an "internal secretion," which he believed the kidneys possessed. Traube's theory was, that it was due to an acute edema of the brain, and he cites cases of nephritis where a goodly portion of both water and solids are voided, and yet uremia exists.

Whenever the kidneys fail to void the normal quantity of solids of the urine, either from degeneration of the organs or from severe congestions, we have the conditions giving rise to uremia.

Strumpell well says: "Probably no one to-day doubts that uremia must be regarded as essentially an intoxication of the body by the retained products of tissue metamorphosis. Numerous experimental investigations have proved that, in animals,

extirpation of the kidneys, or ligation of the ureters, will produce a symptom complex, characterized by vomiting, convulsions, and coma, almost completely analogous to the uremia of Bright's disease; but if we inquire what constituents of the urine are the particular occasion of the uremic phenomena, we can not as yet obtain any definite answer."

For a long time it was believed that urea played a chief part in the development of uremia, but the result of experiments upon animals does not support this view. It is possible to inject enormous amounts of urea into the circulation or into the peritoneal cavity of animals without any symptoms of poisoning. Voit did indeed show that the healthy kidneys remove from the blood the excessive amount of urea with extreme rapidity, and that accordingly uremic symptoms do really appear, if, while we are feeding an animal with large amounts of urea, we impede the excretion of the urea by a simultaneous withholding of water. Yet the amount of urea necessary for the success of this experiment is greater than can possibly exist in the uremia of Bright's disease; and, moreover, the withholding of water might also prevent the excretion of other matters; hence we must seek for other poisonous substances as factors in the production of uremia.

Many experiments seem to indicate that the potassium salts are especially poisonous, while some authors have laid the blame mainly on the extractive matters, such as creatinin. Bouchard has sought to prove that certain alkaloid substances (urotoxins), which are probably developed during the digestion of albumins, and are always demonstrable in normal urine, occasion the phenomena of uremia; but to all these suppositions there are serious objections, so that really the substances which occasion uremic intoxication are as yet unidentified. It might be possible that the poison corresponding to uremia is not in every case the same.

Symptoms.—Uremia may be divided into acute and chronic, the symptoms depending somewhat upon the form the disease assumes. While acute uremia may attend any form of nephritis, it most frequently follows febrile conditions, such as scarlet fever, typhus fever, yellow fever, etc.

The acute form is characterized by the sudden appearance of nervous symptoms so usual to uremia, though in rare cases

the acute form may be preceded by slight headache, general depression, more or less nausea, general malaise, and respiratory oppression.

The chronic form is characterized by the slower and more gradual invasion of the disease, so that months may elapse with the morbid processes involved, where but days, or at most weeks, terminate the acute form. For convenience of description the symptoms will be grouped according to the part affected,—cerebral, dyspneic, and gastro-intestinal.

Cerebral Symptoms.—These show a wide range, embracing, in their entirety, headache, delirium, mania, delusional insanity, convulsions, coma, and paralysis. In some the symptoms resemble an attack of epilepsy, being preceded by headache, the patient complaining of spots before the eyes, with impaired vision, more or less vertigo, ringing in the ears, nausea and vomiting, and finally terminating in convulsions—uremic eclampsia.

At other times the convulsive seizure may occur without any warning. The attacks may be general or local, as in Jacksonian epilepsy. During the interval between attacks the patient usually remains unconscious. The temperature may rise after an attack, though often the thermometer shows either a normal or subnormal range. Not infrequently blindness—*uremic amaurosis*—follows the convulsive attacks, and in rare cases occurs independently of them, though usually they are of but short duration, disappearing in two or three days, there being no structural changes in the visual apparatus. Uremic deafness is a rare result.

Following an attack, there is always unconsciousness for hours, though coma may develop gradually with the convulsions. The pulse is generally slow, full, and tense, though during a seizure it is small and frequent.

Mania may develop quite suddenly, the delirium being active in character, exhausting the patient rapidly and terminating fatally in a short time. At other times, the insanity may be mild in character, the patient being the victim of various delusions, that may lead to self-destruction, if the patient is not closely watched.

Uremic Dyspnea.—Very often, difficult respiration is the first symptom that causes the patient to consult the practitioner. At

first it may be brought on by physical or mental exertion, or it may occur at an early hour in the morning. As the disease progresses, the respiration becomes more and more involved, and is especially severe at night. Finally the patient is unable to lie down, but must assume the sitting posture in order to breathe. The breathing may be noisy and stridulous, or it may assume the Cheyne-Stokes type. This *renal asthma* is one of the most distressing symptoms of uremia.

Circulatory Symptoms.—The heart's action is labored, the pulse being slow and oppressed, save in some acute attacks or during convulsions, when it becomes *rapid*, though small and feeble.

Gastro-Intestinal Symptoms.—Gastro-intestinal irritation may occur early in the disease, and become persistent and distressing. The tongue is heavily coated and foul, the breath has a decidedly urinous odor, while the lips and gums are swollen and of a dark purplish color. Vomiting is sometimes persistent and distressing, lasting for days. Associated with this gastric disturbance is a uremic diarrhea, though it may be independent of the vomiting. According to Grawitz the irritant action of the ammonium carbonate on the intestinal mucosa may give rise to catarrhal or diphtheritic inflammation and ulceration.

Uremic pruritus is probably due to irritation of the cutaneous nerves by crystals of urea.

The temperature is usually normal or subnormal, though uremic fever may accompany the convulsions. A urinous or ammoniacal odor is quite characteristic towards the termination of the disease.

The urine is decreased in quantity, is dark, sometimes coffee-colored, and highly albuminous.

Diagnosis.—We must differentiate uremia from apoplexy (cerebral hemorrhage), cerebral tumor, meningitis, alcoholism, opium-poisoning, and infectious diseases. If you bear in mind certain characteristic symptoms, however, the diagnosis should not be difficult. The history, high arterial tension, accentuated second sound of the heart, albuminuria, low temperature, vomiting, foul tongue, and urinous breath and convulsions, can hardly be mistaken for the symptoms of any other lesion.

In apoplexy, the sudden loss of consciousness, the unequal or dilated pupils, and the absence of albuminuria and urinous breath, suggests cerebral hemorrhage.

In alcoholism, the pupils are commonly dilated, there are no convulsions, and the breath is not urinous or ammoniacal.

In opium-poisoning, the pupils are *contracted*. The *eye-ground* in uremia will reveal *albuminuric retinitis*.

It can be distinguished from the infectious diseases by the history and characteristic symptoms already noted; from meningitis, by the mode of onset, the delirium, and attendant fever.

Prognosis.—This must be guarded, as the disease is always grave, though not necessarily fatal.

Treatment.—The object of treatment is to eliminate the toxic excrementitious materials from the blood. To assist the kidneys in their work, we stimulate the skin and bowels by the free use of diaphoretics and hydragogue cathartics. A hot infusion of asclepias may be given freely, after the use of hot packs or the alcohol sweat, to keep up free diaphoresis. The compound powder of jalap (antibilious physic), should be given till free, copious stools are produced. Gelsemium, two to five drops in hot water, may then be given with benefit. Echinacea will be found beneficial in these cases. Where there is great prostration, the subcutaneous injection of a normal saline solution will prove of much benefit. Santonin, two or three grain doses of the first trituration, will increase the action of the kidneys and help in the process of elimination. Hot diuretic infusions, such as triticum repens, uva ursi, buchū, epigea repens, and althea, will stimulate the kidneys to increased action. For the convulsions, hypodermic injections of morphia will generally afford relief.

ACUTE BRIGHT'S DISEASE.

Synonyms.—Acute Nephritis; Exudative Nephritis; Catarrhal Nephritis, Tubal Nephritis.

Definition.—Acute inflammation of the entire structure of the kidney, varying in degree and form, and due to the action of cold or toxic agents upon the kidney.

Since every part of the kidney may be involved, writers have described a tubular, a glomerular, an interstitial, and a diffuse nephritis, while Delafield describes three varieties: (1) Acute degeneration of the kidney; (2) *Acute exudative nephritis*; (3) Acute productive nephritis. These various forms, how-

ever, are only interesting in an etiological and pathological sense, and are of no practical value.

Etiology.—Acute nephritis is a disease of early life, though it may occur at any age. It is found more frequently in males than in females, owing to greater exposure in the male. The chief exciting causes are:

FIGURE 31. CORTEX TUBES. ACUTE EXUDATIVE NEPHRITIS. (*Delafield*.)

Cold.—Exposure to cold and dampness is perhaps the most frequent cause, particularly exposure due to a drinking spree.

Alcoholic intemperance, aside from the exposure that usually attends overindulgence, is a cause, and albuminuria is not uncommon in beer-drinkers.

The *toxins* from the infectious fevers, particularly *scarlet* fever, which usually manifests itself during convalescence, is a frequent cause. It may also follow diphtheria, typhoid fever,

measles, chicken-pox, influenza, small-pox, relapsing fever, cholera, yellow fever, typhus, cerebro-spinal fever, dysentery, tuberculosis, erysipelas, acute articular rheumatism, malaria, and more rarely syphilis.

Certain *toxic drugs*, such as turpentine, carbolic acid, cantharides, potassium chlorate, salicylic acid, phosphorus, lead, arsenic, mercury, iodoform, and the mineral acids.

Chronic skin-diseases and severe burns may also prove exciting causes.

Pregnancy.—It is not uncommon during the last months of pregnancy, especially in primipara, for a nephritis to develop. This is due partly to pressure on the renal vessels by the gravid uterus, and partly to the altered blood changes.

Pathology.—The appearance of the kidneys and the anatomical changes depend upon the degree of the inflammation, the portion involved, and the stage of the disease.

While the volume of the organ is always increased, there may be no perceptible change to the naked eye where the inflammation is mild. The fibrous capsule is loosely attached, and may be easily stripped off, unless previous inflammation has resulted in firm attachments. In the more severe form, however, the organ is swollen, of a dark-red color, and, when incised, the cut surfaces drip blood, and the tissue is soft and friable. The pyramids and malpighian bodies are found deeply stained, which change to a mottled appearance as the disease progresses, the anatomical changes that take place are responsible for the differentiation of the different forms of nephritis which have been given by authors, and are as follows:

Glomeruli.—The epithelial cells of the tufts are the principal seat of the inflammation when due to the toxic effect of drugs or infectious diseases. The cells at first become swollen and granular (cloudy swelling), but later they may become irregular in form and undergo fatty or hyaline degeneration. Accompanying these changes, exudative processes are taking place in the interstitial tissue, which make the entire process a true nephritis. In some cases of scarlatina, the parenchymatous degeneration is almost entirely confined to the glomeruli, when it is termed glomerulo-nephritis.

Changes in the Tubules.—The tubular epithelium undergoes similar changes; viz., cloudy swelling, followed by fatty and

granular degeneration. This lessens the caliber of the tubule, and, as a result, the tubule becomes choked with the altered contents. The convoluted tubules contain, in addition to the changed epithelial cells, leukocytes and blood-corpuscles.

Interstitial Changes.—In nearly all cases of nephritis, an inflammatory exudate, consisting of serum, leukocytes and red

FIGURE 32. A GLOMERULUS. ACUTE EXUDATIVE NEPHRITIS. (*Delafield.*)

blood-corpuscles, takes place between the tubules. Later, round-cell infiltration may take place, and where this exudate becomes organized, we have a fibroid degeneration of the kidney, with permanent impairment of its function.

. **Symptoms.**—The onset is usually sudden when due to exposure to cold, and frequently during the convalescence of scarlet fever. The patient will be seized with a chill, or chilly sensations will appear, with nausea and vomiting, and often

in children a convulsion—uremic—ushers in the disease. The latter may also be the initial symptom in the adult. Edema rapidly ensues, the eyelids and face becoming puffy within twenty-four or forty-eight hours, to be soon followed by dropsy in the ankles. The fever varies, though usually never very high, ranging from 101° to 103° . The pulse is generally hard, with increased tension and accentuation of the second cardiac sound.

The *urinary symptoms* are characteristic. The urine is scanty, highly colored, smoky, and contains albumin, red and white blood-corpuscles, hyaline, granular, and epithelial casts. The quantity varies from a few ounces to two pints, though in very severe cases there may be suppression. The specific gravity at first is high, 1.025 or higher, but later it falls to 1.010 or 1.015. There is a frequent desire to void water, attended with more or less tenesmus.

Anemia develops very early, and, where dropsy becomes extensive, ascites, hydrothorax and hydropericardium become prominent features, dyspnea being one of the most distressing symptoms.

The disease may come on very insidiously. The patient has but little pain, and for some time is not aware of his true condition. The skin becomes pale, and sometimes a little waxy. It is dry and constricted, there is slight headache, and the patient desires to micturate quite often, though the quantity is small. The eyelids are puffy on rising; but this disappears as the day advances. There is loss of appetite, nausea, and sometimes vomiting. Headache is a general complaint.

Gradually dropsy becomes more marked, there is more or less dyspnea, and the symptoms are those of the chronic form. The urine is small in quantity, four to six ounces, is dark red, and loaded with albumin and casts.

Diagnosis.—This will depend upon the history of the case, the general appearance of the patient, and the presence of albumin, hyaline, granular, and epithelial casts, and white and red blood-corpuscles in a highly colored urine.

Whenever a patient complains of headache, and there is pallor of the skin, puffy eyelids, muscular twitching, nausea, and vomiting, the urine should be examined.

The pregnant woman's urine should be tested occasionally,

after the sixth month, especially if diminished in quantity. We are to remember, however, that we may have albumin in the urine in both pregnancy and febrile diseases, and not have nephritis; in these cases, however, there are but few casts.

Prognosis.—This depends somewhat upon the character of the inflammation and the cause giving rise to it.

When due to cold or pregnancy, the prognosis is favorable, and the duration not long. Scarlatinal nephritis is more serious, though not necessarily fatal. If the edema disappears, and the urine increases in quantity and becomes lighter in color, the case is favorable. The nephritis following or accompanying typhoid fever and diphtheria is also favorable.

Where severe, and due to phosphorus or mercurial poisoning, or when it occurs in cholera or yellow fever, the outlook is not so favorable; also when there is great dropsical effusion, the fluid involving the cavities, as in ascites, hydrothorax, and hydropericardium.

Treatment.—The patient should be put to bed, kept between blankets, and not allowed to get up till all traces of the disease have disappeared. In the treatment of nephritis the profession seems divided as to the use of diuretics and the use of fluids; one advocating the flushing of the kidneys with various diuretics, while another will advocate the withholding of fluids, even in the way of nourishment, confining the patient to a strictly dry diet and limiting the water-supply to eight or ten ounces per day. I believe that there is a happy medium between these two extremes.

Where there is active fever, and the inflammation sthenic in character, diuretics should not be used, though water may be taken in moderate quantities. In such cases we begin our treatment with the appropriate sedative, aconite or veratrum, as the case may require, and combine with it *gelsemium* if the face be flushed and the patient restless, showing evidences of nervous irritation. *Rhus tox.* will replace the *gelsemium* if we have the sharp stroke of the pulse, elevated papilla on tongue, with pinched features. In the child there is sudden starting in the sleep. In such cases *rhus tox.* is the remedy. If there is much tenesmus, viburnum will be useful, while eryngium and apis will be called for when there is a sensation of burning in the bladder and urethra on micturition.

Echinacea will be a splendid agent, with the first evidence of uremia. As soon as the fever subsides and the acute symptoms pass off, mild and unirritating diuretics will be useful. A hot infusion of althea, verbascum, apium, polytrichum, etc., will increase the flow of urine, when the more tonic diuretics, hydrangia, agrimony, collinsonia, uva ursi, etc., will give good results.

Pilocarpin.—Where the skin is dry and harsh, with high temperature, and the pulse is *full* and *strong*, a hypodermic injection of one-eighth grain of pilocarpin will be found very beneficial.

Apocynum.—For the puffiness of the eyelids and face, and later for general dropsy, apocynum is one of our best agents.

Fowler's Solution.—For the anemic condition as shown by the pale, waxy skin and the colorless tongue, Fowler's solution ten drops, to water four ounces, a teaspoonful every hour, will be found to be beneficial. If there be hemorrhage, gallic acid in five-grain doses will bring prompt relief.

The bowels should be kept soluble during the entire course of the disease, and perspiration encouraged. Where nausea and vomiting are present, the stomach may be washed out, by having the patient drink freely of warm mustard or salt water, after which rhus tox., ipecac, nux vomica, and like remedies may be used.

The diet should be bland and unirritating, and consist mostly of milk; buttermilk or whey may also be used, as may also chicken, clam, or mutton broth. Later, gruels, the cereals, and fruits may be added, but meat and potatoes should be restricted until the patient is well in the convalescent period.

As a drink, pure water is perhaps the best, though a little cream of tartar, with lemonade and sugar, makes a good diluent drink.

The acetate and citrate of potassium and the benzoate of sodium, well diluted, render the urates less irritating, and favor their elimination, and will be found useful in the later stages.

During convalescence the child should be guarded from taking cold. Where possible, a change to a warm, sunny, and equable climate will prove highly beneficial.

CHRONIC BRIGHT'S DISEASE.

Although two kinds of nephritis, chronic parenchymatous nephritis and chronic interstitial nephritis, are described under the name Chronic Bright's Disease, each possesses to a great extent the same lesion, the only difference being in the exudation.

In the former there is dropsy, and post-mortem reveals the large white kidney, though the white *small* kidney may be found.

In the latter, cardio-vascular changes are prominent, and dropsy is usually absent.

CHRONIC PARENCHYMATOUS NEPHRITIS.

Synonyms.—Chronic Desquamative Nephritis; Chronic Tubal Nephritis; Chronic Diffuse Nephritis with Exudation.

Definition.—A chronic inflammation of the kidney, in which there is degeneration of the renal epithelium, connective tissue changes in the stroma, permanent changes in the glomeruli, and an exudation from the blood-vessels.

Etiology.—This is mostly a disease of early and middle life, though no age is exempt. Males are more often affected than females, the greater exposure, mode of life, and drink habits of the former, no doubt, accounting for the difference in the two sexes.

It may follow the acute nephritis of cold, scarlet fever, or pregnancy, or chronic congestion of the kidney, though usually it begins insidiously and seemingly independent of any acute disease.

Occurring in children, however, there is usually a history of scarlatinal nephritis.

Indulgence in alcoholic and malt beverages is no doubt responsible for the disease, the frequency with which it appears in beer-drinkers being evidence. Malaria is regarded by many authors as being a cause of chronic nephritis. Workmen exposed to cold and damp, and who live in damp, poorly ventilated apartments, are subject to Bright's disease.

Tuberculosis, syphilis, and suppurative diseases are also associated with chronic nephritis. In all probability, toxins either from a perverted metabolism or introduced from without, so

influence the nutrition of the kidney as to give rise to chronic diffuse nephritis.

Pathology.—Although there are several pathological types of chronic nephritis, one form may merge into another, so that the line of demarcation may be very difficult, if not impossible, to detect. Three principal forms, however, are easily recognized.

FIGURE 33. A GLOMERULUS WITH GROWTH OF CAPSULE CELLS. SUBACUTE PRODUCTIVE NEPHRITIS. (Delafield.)

(1) The *large white kidney*; (2) The *small white kidney*; (3) The *red or variegated kidney of chronic hemorrhagic nephritis*.

The *large white kidney*, the most common type, is usually smooth and pale, or yellowish in color, and the capsule loosely attached, so that it readily strips off. The cortex is broader than normal, owing to an extensive growth of connective tissue, and a cut section reveals a yellowish-white or mottled appear-

ance. The pyramids are highly congested and of a deep-red color. The microscope reveals the renal epithelium swollen, with fatty and granular degeneration, and the tubules of the cortex are distended with tube-casts, coagulated matter, and blood-corpuscles. Hyaline changes are also found in the epithelial cells.

The glomeruli are enlarged, the capsule cells increasing in

FIGURE 34. A GLOMERULUS WITH THE GROWTH OF TUFT CELLS. CHRONIC NEPHRITIS WITH EXUDATION. (*Delafield.*)

such numbers as to compress the tufts. The interstitial tissue is increased and shows polynuclear leukocytes, red-blood cells, and round cells throughout certain areas, and some thickening of the arterial walls.

The *small white kidney*, or secondary cirrhotic kidney, results from the gradual increase in the connective tissue, followed by a shrinkage due probably to advanced degeneration of the epi-

thelium. Some observers believe that this variety may be independent of the first form. The capsule is thick, rough, or granular, and not so easily detached. On section, the structures are found dense and resisting, and present numerous yellowish-white foci, due to fatty degeneration of the epithelium of the glomeruli and convoluted tubes. As the interstitial tissue increases, the parenchyma atrophies.

As the interstitial changes progress, many of the glomeruli are destroyed, while the degeneration of the epithelium of the convoluted tubes is extensive; there is also thickening of the arteries.

The *chronic hemorrhagic kidney* is enlarged, congested, and of a dark-red color or mottled appearance, closely resembling acute diffuse nephritis. The capsule is adherent to the roughened surface. A cut section reveals the cortex thickened in places, while contracted at other points, due to the interstitial alteration. The reddish-brown or mottled areas are due to hemorrhage in and about the tubes. The further changes are the same as found in the large white kidney.

Symptoms.—When it comes to the clinical phase of Bright's disease, we are unable to differentiate the various types just mentioned, the symptoms of one being more or less common to all. If the disease follows an acute nephritis, it will be difficult to draw the dividing line that separates the one from the other, so insidiously does the one merge into the other. In a large proportion of cases, it comes on insidiously, with but few, if any, characteristic symptoms of nephritis.

The patient notices that he is losing flesh and strength, that he tires on the slightest exertion, that his appetite is failing, and that nausea is often present. He may have a sense of weight and uneasiness in the loins and frequent desire to micturate, though the secretion is not normal in quantity. It will now be noticed that his color is bad, he is pale, or the skin has a muddy hue, there is puffiness of the eyelids and face, soon followed by swelling of the ankles and in time by general anasarca.

The urine is characteristic, though the quantity varies at times. When the inflammation is very mild, the quantity may be nearly normal; but with the exacerbations that occur, the urine is very scanty and sometimes almost suppressed. It is

dark or of a smoky color, and always contains albumin and tube-casts. On standing, a heavy sediment is deposited containing tube-casts, hyaline, granular, epithelial, and fatty casts of various sizes and forms, together with leukocytes, red blood-corpuscles, epithelium from the kidneys and pelvis, and a large deposit of albumin.

The specific gravity ranges from 1,020 to 1,030, though in the later stages it may be as low as 1,001 to 1,005. The albumin in severe cases may amount to one-third or one-half of the urine voided.

Dyspnea may occur quite early, and during the later stages is a constant symptom, which may be due to hydrothorax, to edema of the lungs, to contraction of the arteries, or to failure of the heart's action. The dyspnea is more severe at night and early morning, and is always worse on lying down.

Uremic symptoms may occur, though convulsions are not common in chronic exudative nephritis. Headache, with nausea and vomiting and sleeplessness, followed by dullness and coma, with muscular twitchings, would be the symptoms of uremic poisoning, and would be serious. There is generally increased tension of the pulse, and hypertrophy of the heart is quite common. Nephritic retinitis, as shown by dimness of vision, occurs quite often.

Course of the Disease.—This is quite variable, and may be short or of long duration. In some cases the anemia, dropsy, and albumin are present from a very early stage, and continue without interruption till death, which occurs in one or two years.

Other patients will have attacks of dropsy and dyspnea lasting for weeks or months, followed by a seeming return to health. If the urine be examined, however, during these intervals, albumin will be found present.

Other cases only show pallor of the skin, and urine of low specific gravity containing albumin, for years.

Diagnosis.—The diagnosis of Bright's disease is readily made by a chemical and microscopic examination of the urine, though it may be very difficult, if not impossible, to determine the stage and type of the disease. In the large white kidney, there is generally less urine passed, and it has a higher specific gravity than in the other forms, and there is more dropsy present, while the history of alcoholism and the presence of

blood-casts and red blood-corpuscles in the urine would suggest the hemorrhagic kidney.

Prognosis.—Albuminuria or Bright's disease is one of the gravest of diseases, and the prognosis is generally unfavorable. Life may be prolonged for years by judicious treatment, though the disease may terminate fatally in three months.

In children, chronic nephritis following scarlet fever may terminate in recovery. If the disease has continued one year, it is nearly always unfavorable. Death is usually the result of uremia, dropsy, cardiac dilatation, or other complications.

Treatment.—This will be along the same lines as indicated in acute Bright's disease. We are not to forget, however, that in chronic nephritis we have a vice of nutrition as well as an inflammation, and that remedies that improve the condition of the digestive apparatus and make a better blood-supply are equally important with agents to correct renal wrongs.

The patient should wear flannels to protect the body from chilling, and, where possible, he should remove to a warm and equable climate. Alcoholic and malt stimulants must be restricted. The diet should consist largely of milk in some form, sweet milk, buttermilk, whey, or malted milk, as the patient may prefer. Rich broths and fruits are to be used as the patient may desire. Pure water may be taken freely, and helps nature flush the uriniferous tubules of their inflammatory products. An infusion of the vegetable diuretics mentioned in acute nephritis will be found useful.

To improve the condition of the skin, jaborandi and pilocarpin will be successfully used. To relieve the dropsical effusion and at the same time improve the tone of the heart, apocynum and digitalis will be among our best agents.

Constipation must be overcome by the use of seidlitz salts, antibilious physic, elaterium, apocynum, and like agents.

Fowler's solution, strychnia, quinine, and iron may be useful as tonics when such agents are required. The old compound tonic mixture, the triple phosphate of iron, quinine, and strychnia, will be found an efficient combination. Howe's acid solution of iron in drop doses will also be found useful where a ferruginous preparation is indicated.

Counter-irritation, though unpleasant, will often prove beneficial, and the old compound tar-plaster, or the more modern

thapsia plaster worn over the loins, will be attended with good results.

Berberis aquifolium is a good remedy in controlling inflammation, and also as a tissue-builder, and should not be overlooked. Oversexual indulgence *must* be strictly enjoined, as it not only aggravates the disease but is regarded by some as an exciting cause.

CHRONIC INTERSTITIAL NEPHRITIS.

Synonyms.—Contracted Kidney; Cirrhosis of the Kidney; Granular Kidney; Gouty Kidney; Renal Sclerosis; Chronic Productive Nephritis without Exudation, etc.

Definition.—A chronic inflammation of the kidney, in which there is a growth of new connective tissue in the stroma, degeneration of the parenchyma attended by atrophy, and more or less cardio-vascular changes.

Etiology.—This is a disease of advanced life, and is most often seen after the age of fifty. Males are more subject than females, owing to greater exposure and dissipations. The causes that give rise to this form of nephritis are not always readily determined. Heredity seems to have some influence, the disease occurring in some families to the fourth generation.

Arterial degeneration also favors cirrhosis of the kidneys. Alcoholism and syphilis, undoubtedly, are forces that must be considered as etiological factors. Acute articular rheumatism is sometimes followed by interstitial nephritis, while malaria precedes chronic nephritis often enough to be regarded as figuring in the etiology.

Chronic lead-poisoning and gout may also cause it. Over-eating and drinking, especially of meats and rich foods, causes increased work to be thrown upon the kidneys in their effort to get rid of the products of imperfect metabolism, and that irritation may give rise to sclerotic changes. Mental worry and overwork are not to be overlooked as predisposing causes.

Pathology.—The kidneys vary in size from those slightly reduced from the normal, to an ounce each. They are firmly imbedded in adipose tissue. The capsule is thick, and so firmly adherent, that, in stripping it from the kidney, portions of the latter come with it. The kidney is firm and resisting on section,

and reveals a cortex very much thinned and atrophied and of a red or gray color. The pyramids are also of a dark-red color and reduced in size. The outer surface of the kidney is rough or granular, and frequently corroded with small cysts.

The microscopic changes as given by Delafield are as follows: "There is a growth of new connective tissue in the cortex,

FIGURE 35. AN ATROPHIED GLOMERULUS. CHRONIC NEPHRITIS WITHOUT EXUDATION. (*Delafield.*)

and also in the pyramids, which becomes more and more extensive as the disease progresses. In the cortex, the new tissue follows the distribution of the normal subcapsular areas of connective tissue, and is in the form of irregular masses, or is distributed diffusely between the tubes. In the pyramids the growth of new connective tissue is diffuse.

"The tubes, both in the cortex and in the pyramids, undergo marked changes. Those included in the masses of connective

tissue are more or less dilated; their epithelium is flattened, some contain cast matter, while many are obliterated. The tubes between the masses of new connective tissue are more or less dilated; their epithelium is flattened, cuboidal, swollen, degenerated, or fatty. The dilatation of the tubes may reach such a point as to form cysts of some size, which contain fluid or coagulated matter. These cysts follow the lines of the arteries or tubes, or are situated near the capsules.

"Of the glomeruli a certain number remain of normal size, but with the tuft-cells swollen or multiplied. Many others are found in all stages of atrophy and of change into connective tissue. The atrophy seems to depend partly upon the growth of tuft-cells and intracapillary cells, partly on the thickening of the capsules, and partly on the occlusion of the arteries. If the chronic nephritis follows chronic congestion of the kidneys, the glomeruli remain large, with an increased growth of tuft-cells, or they become atrophied, but with the dilatation of the capillaries still evident. The capillaries of the glomeruli may be the seat of waxy degeneration. The arteries exhibit the same changes as are found in exudative nephritis."

Symptoms.—Unless some complication sets in, like pneumonia, pleuritis, or pericarditis, and causes a rapid degeneration of the kidney, the renal symptoms may be latent for years, and only become manifest late in life, notwithstanding the fact that degeneration has been going on for years. The symptoms are so varied and complex, affecting so many organs, that it is better to describe them under the following heads:

Urinary.—The urine is increased in quantity, often amounting to two quarts, is of a light-yellow color, and may have a specific gravity of 1,005 or 1,010. Frequently the patient is compelled to void water several times during the night, and diabetes may be suspected. There is but little albumin present, especially in that voided in the early morning, and there are but few casts, and those are of a hyaline or granular form, while leukocytes and blood-corpuscles are rarely found.

During acute exacerbations, and later in the disease when there are marked cardiac changes, the albumin and casts are found more abundantly. The quantity is also diminished at this time. The amount of urea eliminated is diminished. In rare cases there may be hemorrhage from the kidneys. In

rare cases the specific gravity, as well as quantity of urine voided, will be normal.

Cerebral.—Headache is nearly always a prominent symptom, and often quite difficult to relieve. Insomnia is not uncommon, especially where the patient is subject to neuralgia of various parts. Headache, with muscular twitching or drowsiness, is the forerunner of uremia or convulsions, and should always put the physician on his guard. The patient may become dull and drowsy, passing into coma, or there may be delirium more or less severe.

Cerebral hemorrhage, followed by coma or hemiplegia, is not uncommon, and is due to changes in the cerebral vessels. The hemiplegia and coma may continue till death, or may disappear in a few days, to be followed by a second or third attack.

Circulatory System.—There may be few symptoms present suggesting cardiac derangement, but a physical examination will determine the true condition. Inspection reveals the apex-beat displaced downward and to the left. Palpation confirms inspection, while percussion gives the dullness beyond the nipple line, confirming the diagnosis of hypertrophied heart.

Auscultation shows accentuation of the second aortic sound, and, where there is relative insufficiency, a mitral systolic murmur.

The pulse is hard, firm, and shows increased arterial tension. The hard, thickened, and tortuous vessels that are palpable show arterio-sclerosis. When compensation fails, the cardiac asthma is a frequent distressing symptom.

Respiratory.—Dyspnea is one of the distressing symptoms of the advanced stage of the disease, though it may be one of the first symptoms to direct attention to the kidney. It may come on spasmodically, and is aggravated by exertion, or on lying down. The dyspnea may be due to several causes, such as contracted condition of the arteries with dilatation of the heart, to uremia, anemia, pneumonia, pleurisy, pericarditis, bronchitis, hydrothorax, and edema of the larynx and lung. Towards the end, the Cheyne-Stokes breathing may occur.

Gastro-Intestinal.—Nausea and vomiting are generally present at some stage of the disease and is suggestive of uremia. Attacks of gastritis or spasmodic vomiting may sometimes threaten the life of the patient. The breath is sometimes foul and urinous. Diarrhea is not uncommon, and may prove very exhausting.

Skin.—There is generally but little edema, and that in the ankles and extremities, though where there is cardiac dilatation or where compensation fails, dropsy may occur.

The skin is usually dry, pallid in color save in great cardiac complications, when it may become cyanotic. Pruritus is an occasional distressing symptom.

Special Senses.—An ophthalmoscopic examination may reveal the first evidence of Bright's disease, nephritic retinitis, flame-shaped hemorrhages being characteristic. Sudden blindness, uremic amaurosis, may be temporary or permanent. Ringing in the ears, more or less dizziness and deafness, sometimes occur.

Diagnosis.—This is not often made in the early stage of the disease. When the patient is passing large quantities of pale urine with low specific gravity, repeated examinations should be made of the urine voided, both night and morning. The presence of albumin and casts would suggest renal sclerosis. If, in addition, there is increased tension of the pulse, and the radial and temporal arteries are hard and sclerosed, and the apex-beat is displaced downwards and to the left, and there is accentuation of the second aortic sound, the diagnosis is quite certain. If to all these we have persistent headache, nausea and vomiting, dimness of vision, dyspnea, and coma, the diagnosis is positive.

Prognosis.—This disease is incurable, and the prognosis therefore unfavorable for a cure, though the patient's life may be prolonged for years with comfort to himself and the enjoyment of a fairly active life, provided that no complication or intercurrent affection prove fatal.

Where the diagnosis is made comparatively early, and the patient instructed how to live, what habits to avoid, and what methods to pursue, life may be prolonged for years. On the other hand, where there is cardiac dilatation and failing compensation, the outlook is bad. Uremic convulsions, coma, and paralysis also portend a fatal termination.

Treatment.—But little can be expected from medicines in the way of curing interstitial nephritis, and our attention will be directed to preventing or retarding further retrograde tendencies, and meet the complications, as far as possible, as they arise.

- PLATE IX.** I. Acute hemorrhagic nephritis.
 II. Chronic parenchymatous nephritis.
 III. Chronic interstitial nephritis.
 (Rosenstein) *Salinger and Kaileyer.*

The hygienic treatment is of great importance. The patient should observe regular habits, avoid severe mental or physical work, take exercise in the open air, dress warmly, and as far as possible, avoid mental worry. Where possible, a removal to a warm and equable climate, where the patient can live a great deal in the open air, will be of marked benefit in prolonging life.

The diet should be nourishing, but easily digested. Meat may be eaten once a day. Vegetables (not much potatoes), and fruits may be eaten freely, and in some cases the cereals. Milk should be taken freely, and cocoa and coffee may be allowed occasionally, though, as a rule, they should be avoided. Alcoholic drinks, beer, and wines should be positively forbidden.

When there is gastric disturbance, only the blandest articles should be allowed, sherry or pepsin whey being generally acceptable to the most sensitive stomach. Pure water may be taken in moderation. The bowels should be kept soluble and the skin moist. A slightly increased arterial tension is not objectionable, and needs no special treatment; but where greatly increased, the strain upon the heart may cause rupture of the blood-vessels. For this, nitro-glycerin is highly recommended. Low tension is usually evidence of cardiac dilatation, there is edema, and the urine is scanty and albuminous. A decoction of apocynum, where the stomach will tolerate it, has a good effect, not only in relieving the edema, but in adding tone to the heart. An infusion of digitalis will also act kindly with these same conditions. For the uremic conditions the treatment will be the same as recommended under the head of uremia and acute Bright's disease.

Convulsions will be controlled by the hypodermic injection of morphia and pilocarpin. Any complication like pneumonia, pleuritis, pericarditis, bronchitis, etc., will be treated according to the conditions present. In fact, in treating interstitial nephritis, we treat our patient symptomatically, meeting the conditions as they arise.

AMYLOID KIDNEY.

Synonym.—Lardaceous or Waxy Degeneration of the Kidney.

Definition.—A degeneration in which a peculiar proteid

substance, lardacein, is deposited in the walls of the capillaries and connective tissue-cells of the kidney.

Etiology.—This form of kidney is always associated with amyloid degeneration of some other part, such as spleen, liver, etc., and, although it is frequently associated with Bright's disease, should not be regarded as a variety of chronic nephritis, as it may occur independently of it. While the cause is obscure, it is most likely due in some measure to retrograde changes in the blood plasma, whereby the blood is unable to manufacture normal tissue. It is secondary to chronic suppurative diseases, especially those of the bones, and is often tubercular. Ulceration of the bowels, tuberculosis, anal fistula, the ulcerative stage of syphilitic deposits in the bone, and, in fact, any chronic suppurative process whereby there has been a long-continued drain on the albumin—gout, cancer, malaria, leukemia, and chronic valvular diseases—have been associated with the amyloid kidney; but just how much, if any, these diseases are responsible for the degeneration is not known.

Pathology.—The kidney presents a characteristic appearance. It is large, smooth, and of a grayish-white or yellow color. On section the cortex presents a peculiar glistening appearance or resembles bacon. It is tough and increased in width. The malpighian bodies stand out prominently, and may sometimes be distinguished with the naked eye. The pyramids are of a dark-red or mottled appearance. On applying Lugal's iodine solution, the degenerated tissue turns a brownish-red or a dark-mahogany or nut-brown color, which, on the addition of dilute sulphuric acid, usually changes to blue.

Microscopically the changes as given by Strumpell are as follows: "We find first the amyloid degeneration, which, in varying extent and combination, affects most frequently the glomeruli and also the capillaries of the cortex, the vasa recta, and sometimes the membranæ propriæ of the uriniferous tubules. In pure amyloid kidney the rest of the renal tissue is normal, but in many cases we find changes in the epithelium,—fatty degeneration, desquamation, and disintegration, and also, not infrequently, interstitial cellular infiltration."

Symptoms.—The symptoms many times are quite obscure, and only discoverable post-mortem. Preceded as it is by some

chronic suppurative or wasting disease, the symptoms are masked or overlooked. The urine varies as to quantity, and may be slightly diminished, normal, or increased, usually the latter. Frequently the patient is required to arise several times during the night to void water, the total amount reaching one hundred ounces. It is generally very pale or straw-colored, of low specific gravity, 1,005 to 1,015, has but little sediment, and varies as to the quantity of albumin present. There may be only traces present, though it is usually quite free, and in rare cases there is none present. Where casts are present, they are of the hyaline, fatty, or granular type.

Dropsy is not a marked feature, though usually present in the ankles and legs, sometimes becoming general. Dyspeptic symptoms are quite common, with furred tongue, unpleasant breath, and occasional vomiting. The liver and spleen are generally enlarged, the sharp outlines of these organs being of diagnostic value.

Diarrhea is quite common, especially late in the disease, and is often due to degeneration of the same character taking place in the intestines or tubercular ulcers. A waxy complexion is common. There is usually no cardiac disturbance.

Diagnosis.—The history of some chronic affection, such as suppurative bone disease, syphilis, tuberculosis, chronic malaria, fistula, and other wasting diseases associated with enlargement of the liver and spleen and the passing of a large quantity of pale, albuminous urine of low specific gravity, and hyaline or granular casts, makes the diagnosis almost sure.

Prognosis.—This is usually grave. The disease comes on so insidiously that degeneration is well established when recognized.

Treatment.—This will consist in an effort to raise the quality of the blood-supply. With a blood rich in red blood-corpuscles, degeneration is at an end. Hence our attention will be turned to correcting the associated ulceration or suppurative lesion.

The bitter tonics, the chlorates, sulphites, mineral acids, echinacea, etc., will be found useful. A nutritious but easily digested diet, exercise in the open air, the avoidance of colds, and a line of treatment suitable to chronic Bright's disease will give the best results.

PYELITIS.

Synonyms.—Consecutive Nephritis; Pyelonephritis; Pyonephrosis.

Definition.—Primarily, an inflammation of the pelvis of the kidney, though the contiguous renal tissue soon becomes involved, with varied results.

Etiology.—The most frequent cause is the irritation arising from foreign bodies, especially from renal calculi, whose roughened surfaces may destroy the mucous membrane. The finer calculi, gravel, or even uric acid sand, may be sufficiently irritating to produce the disease.

The decomposition of retained urine in the pelvis, due to obstruction of the ureter, either from growths or foreign bodies. The extension upwards from urethritis or cystitis, especially where there is gonorrheal infection.

Cancer and tuberculosis of the kidney, and more rarely parasites, as the echinococcus, distoma, etc.; also irritating diuretics, as cubeb, cantharides, turpentine, copaiba, oil of sandal-wood, and mustard. The infectious fevers may also give rise to pyelitis, especially diphtheria, scarlet fever, small-pox, typhoid and typhus fever.

Enlarged prostatic tumors, stricture, and phimosis may also be responsible for this disease.

Pathology.—In the early stage and in the mildest forms of pyelitis, the catarrhal, the mucous membrane is swollen, of a dark-red color or ecchymotic, and covered with a viscid mucus or muco-pus. A turbid urine, which contains pus and epithelial cells, is found in the pelvis of the kidney.

In the most severe forms, the mucous membrane is of a brownish-red, increased in thickness, the veins being enlarged and tortuous, and is covered with a thick, purulent secretion. The submucous tissue, and sometimes the entire wall of the pelvis, becomes infiltrated with serum, and a purulent inflammation and ulceration occur, with an extension into the kidney structure—pyelonephritis. Renal abscesses are thus distributed throughout the organ or there may be but one abscess. Following the more severe infectious fevers there may be a diphtheritic inflammation, with the formation of a false membrane and sloughing of the pel-

vis, and sometimes severe hemorrhages occur. Where the pelvis, of the kidney or the ureter is obstructed for a long time, distention of the pelvis, and sometimes the calyces of the entire kidney, takes place, resulting in atrophy of the tissue and converting the organ into a sac filled with serous or purulent material—*hydronephrosis* and *pyonephrosis*.

Following severe cystitis, there may be acute suppurative inflammation of the kidney, the so-called *surgical kidney*. This is usually bilateral pyelitis, and unilateral when the result of a calculus.

Symptoms.—The symptoms of a primary lesion may so obscure the disease that there will be no characteristic symptoms to suggest pyelitis. In simple catarrhal cases, there will be pain and tenderness over the affected kidney, slight fever, frequent desire to micturate, though the urine is scanty and more or less turbid, acid in reaction, and contains a few pus cells, some mucus, more rarely red blood-corpuscles, and if pus is abundant there will be albumin.

In *chronic* pyelitis and pyelonephritis, scanty secretion of urine is rare, and not infrequently it is increased to three or four times the normal quantity, due, as suggested by Senator, to the diminished absorption of water from the urine in the medullary substance and to compensatory hypertrophy of the sound portions of the affected kidney and of the well kidney, as well as to cardiac hypertrophy.

In the more severe cases, the pain is often *severe*, extending down the ureters. Deep pressure reveals marked soreness. The urine is dark in color, owing to the presence of red blood-corpuscles. Pus cells and mucus are abundant, and transitional epithelial cells are found, though this may be from the bladder or sound kidney. If there be obstruction of the ureter, either from a calculus, clotted blood, or a plug of mucus, the urine becomes clear from the sound kidney, to become again turbid with pus-cells when the obstruction gives way.

In suppurative pyelitis, there will be rigors, followed by fever, the chills occurring with such regularity that the case is often mistaken for malaria; later the fever may assume the hectic type, and the rigors disappear. At times the fever assumes a typhoid type, though diarrhea and tympanites are not a marked symptom.

As the disease progresses, the symptoms are those of pyemia, the patient losing flesh and strength.

In the chronic form, especially where there is extensive inflammation, the kidneys may become enormously distended, and distinct fluctuation may be observed.

Diagnosis.—A careful history of the case is important in determining causes that lead to this lesion. The character of the urine, which should be examined frequently, is also an important diagnostic feature. Tubercular pyelitis will be recognized by finding tubercular bacilli in the urine and the presence of tubercular foci in the other parts. Calculous pyelitis is sometimes quite difficult to recognize, though a history of renal calculi is quite suggestive, and if crystals of uric acid or oxalate of lime be more or less continuously present, the diagnosis is quite certain.

It is sometimes quite difficult, if not impossible, to differentiate suppurative pyelitis from cystitis; the chief points to be remembered are, that in pyelitis the urine is acid and the pain in the lumbar region, while in cystitis the urine is ammoniacal and the pain is in the bladder. In the female, by catheterization of the ureters, we determine not only the source of the pus but the kidney affected.

The presence of a fluctuating tumor in the region of the kidney would signify pus, though it may be extremely difficult to decide between perinephric abscess and pyelitis, although the edema about the loins and but little if any pus in the urine would suggest the former.

Prognosis.—This depends largely upon the form of the disease. Where tubercular, it is unfavorable, though the pus may become encysted, caseate, and finally calcify, the patient recovering.

In those cases that come on during fevers, or in the catarrhal case, the patient usually recovers. The calculus variety, tending as it does to chronicity and eventually to suppuration, is very apt to terminate fatally from exhaustion.

Treatment.—This will necessarily depend largely upon the producing cause and the type of the disease. Thus when due to cystitis, our attention must be directed to the bladder; if urethral irritation or prostatic troubles are responsible, these must be corrected; if due to a calculus, the treatment will, in the main, be

that for nephrolithiasis. When the infectious fevers have preceded the disease, there is usually more or less sepsis to combat, and antiseptics will be indicated. The treatment, therefore, is symptomatic, meeting the conditions as they arise.

Pure water should be taken freely, and infusions of the milder diuretics, such as marshmallow, polytrichum, triticum repens, etc. Apis, gelsemium, rhus tox., and eryngium will be called for according to well-known indications.

Where there is suppurative conditions, echinacea, baptisia, potassium chlorate, and the mineral acids will be used. Where the tongue is broad and thick, with fullness of tissue and puffiness under the eyes, the acetate or citrate of potassium will give good results. Where the pain is intense, despite the use of hot fomentations, hot-water bottles, cupping, etc., morphia will be used hypodermically. Should there be active fever, aconite, veratrum, jaborandi, and like remedies will be indicated. Should there be fluctuation in the lumbar region, with accompanying symptoms of pus, surgical intervention will be necessary.

The diet will consist of sweet milk, malted milk, buttermilk, whey, and plenty of pure water.

HYDRONEPHROSIS.

Definition.—A dilatation of the pelvis and calyces of the kidney from an accumulation of urine, due to obstruction in some part of the ureters, bladder, or urethra.

Etiology.—Hydronephrosis may be congenital or acquired. When congenital, the constriction is usually due to malformation or defective development. Sometimes the ureter is attached at an acute angle, or the insertion may be quite high. Again, alterations in the lining mucous membrane may form a valvelike obstruction, or there may be a twisting of the ureter upon its axis. The dilatation has been found so great in some cases in the fetus as to form mechanical obstruction during labor. In the adult, the constriction of the ureter may be due to a tuberculous mass, or to malignant growths, or to pressure from tumors.

There may be stricture from ulceration of the ureter, or it may be due to a calculus. Cicatricial bands, the result of inflammatory adhesions, may be responsible for it; also thickening of the

bladder walls from cystitis, enlarged prostate, and urethral stricture. In movable kidney, a twisting or flexion of the ureter may give rise to it. Pressure from a pregnant or displaced uterus as well as ovarian tumors may also produce the disease.

The enlargement may be so small as to escape detection during life, or it may be so enormous as to be mistaken for ascites.

Pathology.—While hydronephrosis may be unilateral or bilateral, it is usually confined to one kidney, its fellow member generally becoming hypertrophied. As the pelvis of the kidney dilates, the renal tissue, from pressure, atrophies, the papillæ become flattened, the uriniferous tubules and glomeruli become smaller and finally disappear, or show as remnants in the walls of the cyst. The mucous membrane lining the pelvis and calyces becomes very much thickened by the growth of connective tissue forming the walls of the hydronephrotic sac, the size of which varies, sometimes becoming so large as to contain two or three gallons of fluid. The fluid contained in the sac in the early stage is urine; but as the disease progresses and the renal tissue atrophies, the secretion becomes more and more of the character of mucous membrane secretion. It is usually thin and colorless or yellowish in color, of low specific gravity, alkaline in reaction, and contains traces of urea, uric acid, various solids, and albumin. Where pus, epithelial and blood corpuscles, are present, the fluid becomes quite turbid. Hypertrophy of the left heart is a frequent complication.

Symptoms.—In the early stages, the symptoms are so obscured by the primary lesion as to be negative, and when due to pressure from tumors or cancer may never be recognized during life. When bilateral and congenital, hydronephrosis usually proves fatal in a few weeks, and has no characteristic symptoms.

After continuing for some time, the tumor enlarges, and the appearance of a visible or palpitating tumor in the region of the affected kidney is the first definite knowledge we have of the presence of the disease. With the further progress of the disease, there is distention of the hypochondriac region, which, when very large, may extend to the median line. The tumor shows considerable resistance, and at times distinct fluctuation. If on the left side, the tumor remains stationary on respiration; but if located on the right side, a deep inspiration gives the tumor a downward mo-

tion. Percussion gives a dull sound, though the tympanitic note of the colon is confusing unless we remember the characteristic sound.

The tumor may be mistaken for an ovarian cyst, or, in exaggerated cases, for ascites. Ovarian tumors, however, do not crowd the lumbar region so prominently, as a rule. Aspiration, however, in some cases, is the only means of determining the true character of the disease, and even this may not be positive, for in advanced cases of hydronephrosis the urinary salts may disappear, the fluid being sero-mucus in character.

In some cases the hydronephrosis is intermittent in character, the tumor mass suddenly disappearing with the discharging of a large quantity of fluids, this being followed by a gradually increasing tumor mass, with some gastric disturbance, intestinal derangement, constipation, or obstinate diarrhea. With the disappearance of the tumor, the general systemic symptoms also disappear, and the patient is comfortable for a time; but with each reappearance of the tumor, there is marked systemic derangement. Suppuration is announced by chills, irregular fever, sweats, small rapid pulse, nausea, and vomiting.

The cyst may rupture into the abdominal cavity, or, perforating the diaphragm, open into the lung.

Diagnosis.—The diagnosis of hydronephrosis is difficult, if not impossible, where the accumulation of fluid is small. With the appearance, in either lumbar region, of a tumor mass, with a gradual decline in the amount of urine voided, the disease would be suggested.

We have to differentiate between it and ovarian cysts, ascites, and splenic and hepatic tumors. To distinguish from solid tumors, the aspirating needle will be used. Aspiration may also aid in distinguishing an ovarian cyst, though, as already suggested, the fluid in advanced hydronephrosis may have changed to sero-mucus, in which case aspiration would not enlighten us. Ascites would be recognized by the uniform enlargement, the fluid filling both lumbar regions.

In pyonephrosis, there will be fever, night-sweats, and marked emaciation, which are generally absent in hydronephrosis.

Prognosis.—The prognosis is usually unfavorable, though where the disease is confined to one kidney and the accumulation

remains small, the patient's life is rarely endangered. In the intermittent form, the disease may disappear after having existed for years. Where the sound kidney becomes involved from any cause, and ceases to perform its function, uremia is apt to follow, with fatal results. When the hydronephrosis is bilateral, the prognosis is always grave.

Treatment.—The treatment for hydronephrosis, save for the relief afforded to pain, or gastric and intestinal disturbances, will be almost entirely surgical. Massage has been highly recommended, and cases have been recorded where a cure has been effected by removing the obstruction. If practiced, however, it should be done by an experienced masseur, as there is danger of rupturing the ureter. When there is a large quantity of fluid in the sac, it may be removed by aspiration, and this repeated as often as it may accumulate; or an incision may be made down to the kidney and drainage obtained, and, if a calculus be present, the foreign body removed. Where badly diseased, the kidney may be removed, though this should only be done as a last resort, as the history of successful extirpation of the kidney is not such as to hope for great success. Where the hydronephrosis is intermittent, a well-applied pad and bandage may prove useful.

NEPHROLITHIASIS.

Synonyms.—Renal Calculus; Renal Gravel.

Definition.—The presence in the kidney or in its pelvis of concretions formed by the precipitation of certain of the urinary solids, and varying in size from small sandy particles up to the capacity of the pelvis.

Varieties.—Renal concretions have been classified,—1. According to their size; thus, *renal sand* consists of fine pulverized crystals, *renal gravel*, a coarser deposit, which may contain particles as large as a pea; *renal stones*, or calculus, where the deposits exceed in size gravel or pea-sized concretions. 2. According to their chemical composition.

1. *Uric-acid calculi* occur most frequently. They vary in size, and are usually smooth, round, or oval in shape, and may have facets where they come into contact with each other. In color, they may be red, brown, black, or yellow. The breakage is crys-

talline, revealing a laminated formation of uric acid and ammonium urate. In children the calculus may be entirely uratic.

2. *Calcium-oxalate* concretions are not so common as the former. They are known as the "mulberry calculi," owing to their resemblance to the fruit of the mulberry, they being dark-brown, or black, oblong in shape, and covered with small nodules and points. They are extremely hard, and a broken surface reveals a radiate arrangement of deposits around a uric-acid nucleus. The smaller stones may be smooth.

3. *Phosphatic calculi*, while frequently found in the bladder, are but seldom found in the kidney. They are a combination of phosphate of lime, ammonia magnesium phosphate, and calcic carbonate. These always form in neutral or alkaline (ammoniacal) urine, and originate chiefly in the bladder. They are generally white or grayish in color, and are soft and easily broken. They may be either smooth or rough.

4. *Renal calculi*, composed of cystin, xanthin, indigo, carbonate of lime, urostealith, and urate of soda, are rare.

Cystin Calculi.—These are of a pale yellowish color and quite soft, generally rough, and in form are oval or cylindrical. While more common in the bladder, they may form in the kidney.

Xanthin.—These are the rarest of all the urinary calculi, and may consist entirely of xanthin, or there may be a mixture of uric acid and the urates. They may vary in color from white to pale yellow or brown, and vary in size from that of a pea to that of a hen's egg. They usually occur in children.

Indigo.—These are very rare. "Ord has reported a case in which an indigo calculus was found in the pelvis of the right kidney of a woman whose left kidney was destroyed by sarcoma. The stone weighed forty grams. Forbes has also reported a case of indigo calculus found in the pelvis and a calyx of one kidney. The stone weighed one hundred and forty-seven grams, was of a dark-brown color, and when drawn across paper left a blue mark." (Ogden.)

Urostealith, or fatty concretions, are very rare, and when fresh are quite soft, but become hard and brittle on drying. They are of a yellowish or brown color.

Urate of Soda.—These are light in color, not very hard, and rarely exceed the size of an average marble.

Carbonate of Lime.—While not uncommon in the herbivora, they are very rare in man. They are of a grayish color, small in size, spherical in form, and very hard.

Etiology.—There are certain predisposing causes, such as age, sex, geographical location, sedentary habits, and heredity.

Age.—Renal calculi are quite common in children and in advanced life, and have been observed in the new-born.

Sex.—Men are more subject to nephrolithiasis than women, the shortness and dilatibility of the urethra in the latter, no doubt, having its influence, as the bladder is the more readily flushed of irritating substances.

Geographical Location.—Renal calculi occur far more frequently in some countries and regions than in others, though the cause has never been made quite clear. Thus England and Holland are known as favorable to the formation of the calculi, and the character of the soil, drinking water, meteorological conditions, and habits of living may all enter as factors in the production of these various deposits.

Sedentary Habits.—Calculi are found more frequently in persons that lead an inactive life. It is very rare among soldiers, sailors, and those devoted to athletics.

Heredity.—There appears to be a tendency to calculi in some families, which would indicate heredity as an important factor.

The diet probably plays some part as a predisposing cause, and an excessive meat diet, the use of sour wine and alcohol, and water containing lime, favor their formation.

As to the precise causes that give rise to renal calculi, we have as yet no positive knowledge. "The precipitation of concretions from the urine is theoretically possible under two conditions; namely, either if the urine contains so much of any material that it can not retain all of it in solution, or if the reaction of the urine becomes so altered that certain substances are thrown out of solution. The simple precipitation from the urine of substances capable of forming calculi by no means, however, alone gives rise to the formation of renal calculi; for microscopic, and particularly microchemic, examination of renal calculi has shown that the calculus-forming substances have not simply crystallized together, but that they are bound together by an organic framework. This latter, probably, is scarcely other than the product of

a catarrhal state of the mucous membrane of the renal pelvis, so that some clinicians have referred directly to a calculus-generating catarrh. Since, however, bacteria may play a causative rôle in the development of such a catarrh, one is forced to the conclusion that, as in the development of gall-stones, so also in the formation of renal calculi, *bacteria* are of great importance. In the case of calculus formation in decomposed urine, bacteria are again concerned, and they must be looked upon as the cause of the alkaline decomposition. In this way is explained the great influence that all conditions of urinary stasis exert upon the formation of renal calculi; for, whenever urinary stasis exists, excessive development of bacteria in the urine is possible." (Eichhorst.)

It will be seen that an important primary cause of calculus is the presence in the urine of some substance that acts as a nucleus about which the layers of crystals adhere. This substance may be mucus, blood-clots, epithelial particles, parasitic ova, tube-casts, or bacteria.

Pathology.—The changes that take place in the tissues depend upon the size, shape, and length of time present. Pyelitis very early follows, the character of the inflammation depending upon the mechanical irritation of the stone or stones. If the calculus be small and smooth, a simple or catarrhal inflammation of the mucous membrane is the result; but with a greater irritation there is likely to be a pyelonephritis or even pyonephrosis. There may be only a slight or a severe hemorrhage attending these processes. Ulcerative process may follow, revealing one or more calculi. Should the ureter become blocked, hydronephrosis is the common result. The calculus may occupy the entire pelvis, and project into the kidney. In rare cases, the calculus, by ulcerative processes, may perforate the ureter, the peritoneal cavity, the intestines, or the lung.

Cystitis, enlargement of the prostate gland, and urethral lesion are not uncommon.

Symptoms.—The symptoms embrace a wide range of phenomena, and depend upon the character and size of the calculi and their location, and may be divided into three classes: First, the passage of the calculus from the pelvis to the bladder; second, the retention of the calculus in the ureter; and, third, its retention in the pelvis of the kidney.

1. *Passage of the Calculus from the Pelvis to the Bladder.*—

If the concretions be very small and smooth, the only symptom may be a long time taken to void water, with an occasional sudden stoppage of flow, which is resumed again as a calculus pops out of the urethra. One patient, an old gentleman under my care, passed sixty concretions about the size of No. 9 bird-shot at a single micturition. They were smooth, and the only annoyance was the length of time consumed in voiding water. At other times, when the stones are large or rough, the pain is most agonizing, of a cutting or tearing sensation, beginning in the affected kidney, passing down along the ureter to the inner side of the thigh, and causing, in the male, a retraction of the testicle, due to the reflex action of the cremaster muscle. The pain is paroxysmal in character, though more or less continuous till it reaches the bladder. During its passage the patient writhes with the intense suffering, and in children a convulsion may ensue. The pulse is small and quick, a cold perspiration bathes the face, the patient is extremely anxious, and sometimes an attack terminates in syncope. In some cases there are chilly sensations, and the temperature may rise to 102° or 103° . Nausea and vomiting are quite common during an attack. There is an almost constant desire to micturate, attended by a burning sensation. The urine is generally scanty and often bloody in character. Occasionally the urine is copious, especially if the fellow kidney is in a normal condition. There may be but one stone present, or they may pass intermittently for years. An attack varies from a few hours to two or more days.

After a severe attack, there is often soreness in the loins and testicles for a day or two.

2. *Retention of the Calculus Within the Ureter.*—The attack begins as a renal colic; but after a time the excruciating pain subsides as the ureter becomes accustomed to the presence of the calculus, or a dull ache or soreness follows, which in time may entirely disappear. If the impaction does not completely occlude the ureter, or, if so, does it gradually, hydronephrosis will follow with its attendant symptoms; but if the obstruction be *sudden* and *complete*, the secretion of urine will cease as soon as the pent-up urine equals the blood pressure in the renal artery. Atrophy of the kidney follows, degenerating into a cyst containing serum, pus, and calculous concretions.

If the fellow kidney be in good condition and able to do its work, no symptoms may develop to tell of the atrophy; but should the second kidney be unable to do its work, anuria with uremia follows, terminating in death.

3. *Where the calculi remains in the pelvis of the kidney*, a pyelitis occurs, varying from the simple to the suppurative form, depending largely upon the size of the concretions. In the milder forms the pain is of a dull, aching character, with tenderness over the affected organ. The urine is highly acid, of a dark, smoky color, and contains pus, blood, epithelial cells, and uric acid or lime salts.

Severe exertion may result in an attack of renal colic.

In the more severe form of pyelitis, the patient may be seized with a chill or rigor, high fever, following, the patient rapidly becoming emaciated. Hectic fever and night-sweats follow, with all the evidence of pronounced sepsis. The urine is scanty, high-colored, and contains pus and blood. If both kidneys are involved, the patient dies of uremia. The general health of many of these patients is but little disturbed.

Diagnosis.—The characteristic pain extending downwards along the ureters and inner thigh, with retraction of the testicles in the male, and pain in the labium in the female, the small, frequent pulse, the cold perspiration, the almost constant desire to micturate, the pain in voiding water, and the scanty, bloody urine, are symptoms that can hardly be mistaken for any other lesion. Where these symptoms are not so pronounced as when the calculus is retained in the pelvis of the kidney, an examination by the X-ray will reveal the presence of the stone.

Prognosis.—Where the calculi are small enough to pass into the bladder, the prognosis is favorable, though the disease has a tendency to recur. Where the calculi remain in the pelvis of the kidney the prognosis is always unfavorable, atrophy of the kidney or pyelitis in various forms resulting. Also where the calculus remains fixed in the ureter, the prognosis is unfavorable.

Treatment.—The first object is to give relief to the agonizing pain, which may be accomplished by the hot bath or the use of hot packs or poultices. A hypodermic injection of morphia, one-quarter grain, at the beginning of an attack, assisted by the in-

halation of chloroform till the patient becomes easy, will be the means for bringing the quickest relief.

In the intervals between the attacks, the treatment will be directed to keeping the urine abundant, and, if excessively acid, to render it alkaline. The free use of aralia, epigea, chimaphila, eupatorium, and althea will yield good results. These agents will respond more promptly, however, as infusions than when given as specific tinctures. The patient is instructed to drink freely of the infusion, which not only increases the flow of urine, but diminishes its acidity. The tincture of eryngium, gelsemium, and apis, when specifically indicated, will not disappoint any one in their action. The free use of plain distilled water, or water rendered alkaline by adding the salts of potassium, the acetate, citrate, or bicarbonate, is to be commended, also lithiated waters.

Piperazin in five-grain doses, three or four times a day, has proved beneficial in some cases, and deserves a place in the treatment of renal calculi, though the exaggerated claims made as to its power as a solvent to uric-acid stones should not be taken too seriously.

Van Noorden and Straus recommend ten to fifteen grains of calcium carbonate, three times a day, as a uric-acid solvent. A number of favorable reports has attended this treatment.

The diet should consist largely of fruits and vegetables; but little meat should be eaten, avoiding especially red meats, liver, and sweet-breads. Starchy food and sweets should be taken in very limited quantities. The patient should live much in the open air, and take regular and systematic exercise. Where the calculus obstructs the ureters, or sets up destructive changes in the pelvis, with septic poisoning, the patient should be turned over to the hands of the surgeon, operative measures giving the only promise of relief.

TUMORS OF THE KIDNEY.

The simplest division of tumors of the kidney is into benign and malignant. The benign are again divided into fibroma, lipoma, lymphadenoma, angionoma, and adenoma. These grow in the cortex of the kidney, forming small nodular masses, and unless they become very large, an exception, they do not produce any definite symptoms. They may be congenital or develop later in life.

The malignant tumors are sarcoma and carcinoma, and may be primary or secondary. While sarcoma may occur in the adult, it is more frequently found in young children, often being congenital. The most common form is the small-celled variety, while a rare form, and one generally congenital, is a mixture of sarcoma and striped muscular fiber, the *rhabdomyoma*.

Sarcomas develop very rapidly, are vascular, and may attain large size, almost filling the abdomen.

Carcinoma is not so common as sarcoma, and generally is found in the adult, though it may occur in children. It is usually soft, encephaloid, and may reach an enormous development. Primary cancer rarely occurs in early life, and is more common in males than in females. Heredity is a strong predisposing cause.

Secondary carcinoma is found in connection with cancer of the testicle, rectum, uterus, stomach, or liver.

Symptoms.—The characteristic symptoms are pain, hematuria, cancerous cachexia, and the presence of the tumor mass.

Pain is not always present, and therefore more or less uncertain as a diagnostic aid. When present, it is located in the affected flank, and extends down the ureter and along the inner side of the thigh. It may be more or less constant, of a dragging character, or occur at intervals, and be sharp and lancinating. Hemorrhage occurs in about half the cases, and though it is usually but small in quantity, it may be severe and exhausting. At times it will be in clots, there will be casts of the pelvis of the kidney and ureter, and when thus passed are characteristic of a malignant tumor; often, however, they are mixed with the urine and perfectly soluble.

Where the hemorrhage is large, anemia rapidly develops. As long as the tumor retains the position and outline of the kidney it is an important symptom; but as it leaves the flank and encroaches upon the abdomen, and adhesions form, it may be impossible to distinguish it from other tumors of the abdomen, though the cancerous cachexia would help in the differential diagnosis. As the disease advances, the appetite fails, nausea and vomiting are frequently present, and the emaciation becomes marked.

Diagnosis.—The diagnosis will be made by the symptoms already given,—*pain, hemorrhage, cachexia, and the presence of a tumor mass, being the most pronounced.*

Prognosis.—The prognosis is almost always unfavorable, the rare cases of recovery being where an early and successful nephrectomy has been performed. The duration of the disease is from a few weeks in congenital cases, to a few years in the adult.

Treatment.—While we have no specifics for malignant growths, there are two remedies that should be given persistently, with the hope of at least staying somewhat the destructive character of the disease. They are echinacea and hydrastis. When severe, the pain will be controlled by morphia. Extirpation may prolong life if resorted to early, though the diagnosis is usually only made after the system has become so thoroughly infected with the malignant poison, that successful nephrectomies are very rare.

CYSTIC DISEASE OF THE KIDNEY.

Cysts of the kidney are more interesting from a surgical standpoint than from that of medicine, since they are but little influenced by medication. They may be congenital or acquired, unilateral or bilateral, and vary in size from that of a pea to that of one which fills the abdominal cavity. There may be but one, or there may be many. The smaller ones are found associated with chronic nephritis. The cysts contain a clear or turbid fluid, varying in color from amber to a brownish black, and containing albumin, blood crystals, cholesterin, uric acid crystals, and the triple phosphates.

Symptoms.—There are no characteristic symptoms to suggest the nature of the disease, but they are rather those of chronic nephritis, and later those of uremia.

Diagnosis.—Where large, a careful physical examination may reveal their nature.

Prognosis.—When unilateral the patient may be but little affected, and when of large size, surgical interference may be followed by favorable results. When the disease is bilateral, it can only terminate in one way, death.

Treatment.—This is entirely surgical, and consists in removing the cyst and capsule, and suturing the kidney. If degeneration has taken place, nephrectomy is the only resort.

PERINEPHRIC ABSCESS.

Synonym.—Perinephritis.

Definition.—A suppurative inflammation of the perinephritic tissues.

Etiology.—Perinephritis may be primary or secondary. The secondary, which is far more common, is due to an extension of a suppurative inflammation from neighboring parts. It may be from caries of the spine, from suppurative appendicitis, abscess of the liver or bowel, pelvic cellulitis, or an extension from the pelvis of the kidney, or of the entire kidney, or from the ureter; also from tubercular or cancerous deposits in the kidney. It may also be secondary to the more septic of the infectious fevers, such as typhoid, small-pox, diphtheria, pyëmia, and kidney affections.

The primary cause is due to sudden exposure and to blows and contusion of the loins.

Pathology.—The suppurative process usually begins in the loose tissue behind the kidney. There may be multiple purulent foci in the early stage, though usually they merge into one large abscess. The abscess wall is soft, shreddy, and ragged where the suppurative process has been rapid, and thick, smooth, and fibrous when more chronic in character.

As the pus accumulates, there is bulging in the region of the kidney, and when very large the liver is crowded on the right side, or the spleen on the left. Burrowing downward along the psoas muscle, it points in the groin, or works its way into the perineum, scrotum, or vagina. It may perforate the peritoneum, the colon, or the bladder. Extending upwards, the diaphragm may be penetrated, and the pus discharged into the pleura or lungs.

The pus is usually very offensive; sometimes fecal in character, owing to its close relation to the bowel, of an urinous odor, the result of infiltration of urine.

Where the disease is of long standing, the fatty capsule may become firmly adherent to the true capsule of the kidney by bands of fibrous tissue.

Symptoms.—The first pronounced symptom is usually pain and tenderness on the affected side between the ribs and the crest of the ilium. At other times rigors, followed by fever of an intermittent character, are the first symptoms announcing the presence of an abscess. As the suppurative process advances, the skin

over the affected side becomes red, edematous, and painful, the patient lying on the back, with the legs flexed to avoid tension.

Where large nerves are pressed, the pain is severe, extending down the thigh and into the testicle or labium. Fluctuation can usually be elicited on palpation. There is loss of appetite, nausea and vomiting, and all the symptoms of septic poisoning.

Should the abscess rupture into the peritoneal cavity, symptoms of acute peritonitis suddenly develop. If it empties into the lung, it is expectorated from the bronchi, while it is passed with the feces and urine when it opens into the colon or bladder.

Diagnosis.—There are certain characteristic symptoms that will make the diagnosis comparatively easy. The bulging over the affected kidney, the skin being red, edematous, and sensitive to pressure, the urine free from blood, pus, and casts, unless the kidney be involved, and finally the use of the exploring needle, render the diagnosis positive. In pyelitis, the urine contains pus, blood, and casts, while in hydronephrosis the pain and tenderness are absent, and the exploring needle reveals water instead of pus.

Prognosis.—This depends somewhat upon the vigor of the patient and the point at which the abscess is directed. If externally, and the abscess is freely drained, the outlook is quite favorable, but if it empties into the peritoneum or the lung, the prospect is unfavorable, and when into the bladder or bowel it is also quite grave.

Treatment.—In the early stage, rest in bed, with the proper sedative and echinacea, the sulphites, chlorates, or mineral acids as the antiseptics, will be the proper internal medication. As soon as the abscess is discovered, free drainage is at once instituted. The longer the delay in making a free incision, the greater becomes the septic poisoning, and the less hope there is for the patient.

II. DISEASES OF THE BLADDER.

ACUTE CYSTITIS.

Definition.—An acute inflammation of the mucous membrane of the bladder.

Etiology.—The causes producing cystitis are numerous, and may be mentioned in the following order:

Catarrhal.—All mucous membranes are exceedingly sensitive to impressions, and that lining the bladder is no exception; thus we find that atmospheric changes, whereby a wide range of temperature occurs within a few hours, or sudden cooling after severe exertion, often gives rise to a catarrhal inflammation of the lining of the bladder. Extreme distention of the bladder may give rise to cystitis, even though there be no change in the quality of the secretion; and where decomposition has taken place from long retention, the irritation is greatly increased. The teasing effect of an enlarged prostate gland, a cystocele or urethral stricture, may be the exciting cause.

Septic.—Under this head will come the irritating action of septic matter introduced by unclean catheters, sounds, irrigators, etc.. The cystitis found in puerperal women and gonorrheal patients are of this class, as well as those suffering from stricture and enlarged prostates, who are compelled to resort to the catheter.

The cystitis that occasionally accompanies the infectious fevers is also to be included in the septic class. Especially, diphtheria, typhoid fever, scarlet fever, and tuberculosis.

Drugs.—The ingestion of certain drugs, by their toxic effect, not infrequently cause cystitis. The most common are cantharides, turpentine, copaiba, cubebs, mustard, and methylene blue. Workers in dye-houses are subject to cystitis, the result of the irritating dyestuffs used.

Traumatic.—The traumatism induced by the rough or unskillful use of instruments used in breaking up a stricture or sounding the bladder, may give rise to cystitis; also the presence of a calculus or foreign body in the bladder, or the pressure of the fetal head during a prolonged and difficult labor, or a mass of impacted or hardened fecal matter may be sufficient to produce like results.

Extension from Neighboring Parts.—We have already seen that the bladder is frequently involved in nephritis, ureteritis, or urethritis. The same results may follow disease of the ovaries and tubes, or of the vagina and rectum. Tumors and abscesses of the pelvic tissue are apt to be attended by cystitis.

Pathology.—The anatomical changes are similar to those of any other mucous surface; viz., intense hyperemia, the membrane being smooth, red, and edematous, and covered with a mucopuru-

lent secretion. There will be patches where the epithelium is denuded, the edges being shaggy from the hanging shreds of epithelium. Where the inflammation is intense, the submucous tissues become involved, and not infrequently ulcerated patches are to be seen. Hemorrhagic effusions may occur about the denuded patches.

As a result of the more malignant forms of scarlet fever, diphtheria and kindred infectious diseases, a diphtheritic ulceration occurs, with necrosis of the entire bladder wall. The urine may be acid in reaction, though usually alkaline, and contains pus, blood, and epithelial cells, all of which decompose rapidly.

Symptoms.—"Acute cystitis commences with pain in the hypogastric region, of a subacute character, with soreness on pressure. There is a frequent desire to urinate, and these calls are attended with an aggravation of the suffering. From the sympathy existing between the bladder and the kidneys, the urinary secretion becomes scanty and high-colored, and its increased acidity gives rise to a painful burning and scalding sensation when it is passed. When the disease has attained its greatest intensity, there is an almost constant desire to micturate, with an intense tenesmus, so that the patient is sometimes obliged to take hold of something with his hands when passing water, and will frequently bite his lips to keep from crying out with the severe suffering.

"With the commencement of the pain the patient is usually seized with a chill or well-marked rigor, which is followed by febrile action, generally of a remittent character, and not very severe. The disease runs a course of from six to twelve days, and terminates in resolution, or in the chronic form; or, in some rare cases, extending to the peritoneum and adjacent fascia, gives rise to the formation of a pelvic abscess."

Diagnosis.—"Acute cystitis is readily determined by the seat of the pain, and by its aggravation during micturition; the change in the character of the urine and its difficult passage, with tenesmus, is additional evidence." In nephritis there are tubercasts, and the quantity of albumin is much larger.

Prognosis.—Simple, uncomplicated cystitis terminates favorably in from five to ten days without any structural change. Where the inflammation extends to the kidney, the outlook is

more grave, and should septic processes be set up, with ulceration of the membrane, diphtheritic in character, the disease may prove fatal.

Treatment.—Gelsemium in full doses, combined with the appropriate sedative, gives good results, and may be the only agents required. We add thirty to sixty drops to a half glass of water, and give a teaspoonful every hour. Where there is smarting and burning in voiding urine, apis and rhus tox. will replace the gelsemium, thus:

℞ Apisgtt. xx.
 Rhus Tox.....gtt. x.
 Waterʒiv. M.
 Sig. Teaspoonful every hour.

Where there is great tenesmus, *cantharides*, five to ten drops in a half glass of water, given every hour, will often bring prompt relief. Eryngium is a useful agent where the desire to urinate is almost constant and the water is highly colored or bloody. When these specifics fail to give the desired results, we will usually get relief from an infusion of *triticum repens* given freely, or an infusion of marshmallows, epigea repens, polytrichum, or eupatorium.

In this day of small doses and pleasant medication, we have failed to make use of the infusions many times at the expense of pain and much suffering to our patients. Their efficacy may be increased by adding to the infusion small doses of the acetate or citrate of potassium or the benzoate of sodium.

When there is evidence of sepsis, echinacea, baptisia, the sulphites, chlorates, or mineral acids will be the better remedies. In the way of local treatment, the hot sitz-bath will be found to give better results than hot packs. The use of opium suppositories acts kindly, and, should other means fail, should be used. Where the suffering is intense and the tenesmus almost constant, a hypodermic of morphia should be used.

CHRONIC CYSTITIS.

Definition.—Chronic inflammation of the mucous membrane of the bladder, attended by more or less structural changes in its walls.

Etiology.—Chronic cystitis may be the result of oft-repeated acute attacks, or it may come on insidiously, following an acute attack which has been neglected. The exciting cause may be a calculus in the bladder, or pressure from the outside, as from a tumor or displaced uterus. It may also arise from a urethral stricture or enlarged prostate, the bladder not being completely emptied, and the urine thus contained becoming acid. Tubercular deposits and neoplasms are among the rarer causes.

Pathology.—In long-standing cases, the mucous membrane becomes very much thickened, affecting its capacity for retaining urine. The surface is not red and velvety, but assumes a purplish or slate color. Its surface is covered with a muco-pus, with here and there an ulcerated patch. There is enlargement of the follicles, and there may be so much obstruction of the ureteral orifices as to cause dilatation of the ureter and pelvis of the kidney, followed by hydronephrosis.

The urine is alkaline, and contains more pus and albumin than in the acute form.

Symptoms.—“Persons suffering from chronic cystitis usually complain of a sense of weight in the hypogastrium and peritoneum, with a dull, dragging pain. There is also tenderness on deep pressure over the hypogastrium. More or less difficulty is experienced in passing urine, sometimes on account of the increased mucous secretion, and at others, from the seeming acidity of the urine. The patient frequently complains of pain in the neck of the bladder, extending the entire length of the urethra, and sometimes of a sensation of scalding or burning referred to the region of the bladder. In severer cases, when complicated with disease of the prostate, or when ulceration has occurred, the pain and heat in the bladder is very severe, the call to urinate urgent and attended by violent tenesmus and straining.

“The general health becomes markedly affected when the disease is severe; the bowels are constipated; the appetite impaired; the skin dry, harsh, and sallow; and there is considerable loss of flesh and strength. The urine varies greatly; in the milder cases it seems nearly natural, but in the more severe cases it contains mucus, pus, and the phosphates. Sometimes it is so thick with the presence of these materials that it is voided with difficulty.”

Diagnosis.—"Chronic cystitis is determined by the location of the pain and tenderness, and its association with difficulty in passing water, and alteration in the urine dependent upon the changed secretions of the bladder. Mucus in the urine may be determined by its action on litmus paper, by its particles coagulating into a thin, semi-opaque membrane, on the addition of nitric acid, and by its soon undergoing putrefactive decomposition, becoming ammoniacal.

"Pus, in urine, generally falls to the bottom when allowed to stand; acetic acid has no effect on it, but if agitated with liquor potassæ it forms a dense, translucent, gelatinous mass. If the urine contains phosphatic deposits, it is often very fetid, sometimes pale, at others greenish, and viscid from the abundance of mucus. On placing some of the mucus beneath the microscope, abundant crystals of the triple phosphate are found entangled in it. Dr. Bird remarks that, "One point must be borne in mind in forming a prognosis from the state of the urine; viz., not to regard it as ammoniacal because the odor is offensive, and not to consider the deposit as purulent because it looks so. A piece of litmus paper will often show it to be neutral, and even sometimes acid, while microscopic inspection often proves the puriform appearance of the urine to be an admixture of the phosphates with mucus. For want of these precautions, I have seen some cases regarded as almost hopeless which afterward yielded to judicious treatment. It is quite certain that the mucous membrane of the bladder may, under the influence of chronic inflammation, secrete so much of the earthy phosphates and unhealthy mucus as to render the urine puriform and offensive without having necessarily undergone any structural change."

Prognosis.—"Though persistent in its character, the disease is almost always amenable to treatment. Cases in which there is enlarged prostate with ulceration of the bladder, are the most intractable, and sometimes prove fatal. When associated with chronic disease of the kidneys, it is almost always fatal."

Treatment.—The treatment will include internal medication, counter-irritants, and local treatment to the bladder walls. In the milder forms of somewhat acute character, the remedies recommended in acute cystitis will prove beneficial; viz., apis, gelsemium, cantharides, eryngium, etc. In the more chronic

forms, and where the urine contains large quantities of mucus, phosphates, etc., we will get better results by the use of additional remedies.

Agrimony.—Where there are large quantities of mucus, or mucus pus, and blood, agrimony will be found to give good results. Agrimony one or two drams, to water four ounces, a teaspoonful every three or four hours.

Colorless hydrastis and cubeb are also good agents when the same conditions prevail.

Eryngium will be found useful where there is continual uneasiness and the water is scanty and high-colored.

Hydrangia.—Where there is constant backache and the bladder is *irritable*, hydrangia will give good results.

Elaterium.—This is the remedy so highly praised by Dr. John King, and where the inflammation is at the neck of the bladder, with constant pain, the urine passing spasmodically and leaving unpleasant sensations, the remedy is a good one.

Rhus aromatica will be a good remedy where there is some hemorrhage.

Santonin will prove a good agent where the urine is scanty and passed with difficulty.

Salol.—Where the urine is excessively alkaline, salol in five-grain doses every three or four hours will not prove disappointing.

Injections.—We can not secure the best results, and many times not effect a cure, unless we can secure a *clean* bladder, and wash out the irritating and decomposing urine. The double catheter may be used, allowing the fluid to escape as rapidly as it flows in; or a soft rubber catheter may be attached to a glass funnel, and the bladder filled, then, by depressing the tube, the water allowed to flow out. Where the deposits are abundant, the bladder should be *thoroughly* irrigated, one, two, or three times a day. We use plain sterilized water or a normal saline solution, boracic acid solution, or weak solution of potassium chlorate.

Following this treatment, much benefit may be derived by introducing into the bladder a solution of colorless hydrastis and sulphate of zinc; say hydrastis, one dram; zinc sulphate, four grains; water, one ounce. Should this be followed by much pain, it may be washed out with tepid sterile water.

Where there is great pain, morphia may be added to the solu-

tion introduced, using one-third or one-half grain to the ounce; or one grain of opium may be used as a rectal suppository.

The older Eclectics obtained good results from counter-irritation over the bladder, and, though rather unpleasant treatment, it will be found to give good results in the more stubborn cases. The old compound tar-plaster may be used to suppuration, or the more modern thapsia plaster.

The bowels should be kept in a soluble condition. Of course, if there be stricture of the urethra or enlarged prostate gland, our attention must be directed to overcoming these difficulties before we can expect much, if any, relief to the cystitis. Where the irritation is persistent and the deposits large, and the treatment has failed to give relief, as a last resort drainage by way of the vagina in the female and the perineum in the male, is to be advised.

VESICAL HEMORRHAGE.

Synonym.—Vesical Hemorrhoids.

Definition.—A hemorrhage from the walls of the bladder.

Etiology.—Quite a variety of causes may give rise to hemorrhage from the bladder, and, though usually symptomatic, the use of the endoscope in recent years has revealed a hemorrhoidal condition of the veins of the bladder that is responsible for hemorrhages that were heretofore inexplicable. Malignant diseases of the bladder that in their ravages destroy arterial vessels, are attended by hemorrhages, and malarial hematuria is not uncommon. Leukemia may also be a causal factor. As a mechanical cause, the irritation from renal and vesical calculi is not to be overlooked. Rarely, hemorrhage from the bladder occurs in the latter months of pregnancy.

Symptoms.—Aside from the presence of blood in the urine, there will be a sense of fullness in the bladder, and the pain is of a dull, aching character, with a sense of weight and oppression when due to hemorrhoidal veins.

Diagnosis.—A positive diagnosis can only be made by a cystoscopic examination of the bladder, though the absence of the usually well-defined symptoms that accompany renal hemorrhage would suggest hemorrhage from the bladder.

Prognosis.—This is generally favorable, though fatal cases have been reported.

Treatment.—Hemorrhage from the bladder will be treated on the same principle as bleeding from any other part. If active in character, gallic acid in five to ten grain doses will give good results; or equal parts of oil of erigeron and oil of cinnamon, five to ten drops per dose, will be useful, while some will prefer ergot in from ten to sixty drop doses.

When the bleeding is due to a hemorrhoidal condition of the veins, such remedies as *æsculus*, *collinsonia*, and *hamamelis* will give better results. *Hamamelis* may be used in irrigating the bladder, as may a weak solution of tannic acid, boracic acid, or alum.

NEUROSES OF THE BLADDER.

IRRITABILITY OF THE BLADDER.

We quite often meet with patients, especially with women of nervous temperaments, in whom there is a hyperæsthetic condition of the bladder, usually about the urethral or ureteral orifices (vesical trigone) that is independent of structural disease of the organ or mechanical irritation from a calculus.

Etiology.—This unpleasant, and often exceedingly painful condition, generally occurs among patients of a neurotic temperament, hysterically inclined. As a result, we find the patient excited or melancholy, the appetite capricious, and, being usually poorly nourished, cross, peevish, and making life a burden to herself and those around her.

Often there is dyspepsia, with the many symptoms attendant on that lesion, or there is menstrual derangement, dysmenorrhea, menorrhagia, or amenorrhea. At other times it is the result of severe mental or physical work, overindulgence in venery, or sexual intercourse, or the many dissipations of fashionable life; such as late hours, indigestible food at unreasonable times, etc. Other cases are purely reflex and due to uterine derangements, rectal diseases, and wrongs of the vagina or urethra. There is also an irritability of the bladder developed in some cases of chronic malaria.

Pathology.—With the exception of a hyperemic condition of the bladder, there are no pathological changes.

Symptoms.—*Pain, frequent calls to micturate*, and rectal or vesical tenesmus, are the *four* characteristics of an irritable bladder. The pain and tenesmus may be relieved by micturition, or may be increased, the latter being especially true where there is a spasmodic condition of the muscular walls of the bladder, the hyperemic and exquisitely sensitive mucosa being so greatly irritated as to cause excruciating pain, which persists during the intervals of micturition. This spasmodic action may be so marked as to cause retention of the urine, while at other times the urine is passed suddenly and spasmodically. Some cases will complain of a constant, dull, aching pain in the bladder. The pain extends along the urethra, and often the patient cries out in his distress.

Diagnosis.—This is readily made by the four characteristic symptoms,—*pain, frequent micturition, rectal and vesical tenesmus*.

Prognosis.—This is often a stubborn and chronic lesion, sometimes continuing for weeks or months, though life is never endangered.

Treatment.—These cases are frequently quite stubborn and require much care in the treatment. The patient must refrain from severe mental or physical work, be regular in her habits, and avoid dissipations of all kinds. Any wrongs of the uterus and its appendages must be corrected and the rectum should be examined for hemorrhoids, pockets, papillæ, fissures, ulcers, etc., and if there be urethral troubles, these must be corrected.

In the way of remedies, we have a number that will give good results. *Triticum repens* drunk freely as an infusion is one of the best. The tincture of red onion, one or two drams to half a glass of water, and given in teaspoonful doses every hour, is also very good. *Rhus aromatica* one dram, to four ounces water, and a teaspoonful every hour, will relieve a large per cent of the cases. Where there is a burning and stinging sensation, *apis* is the remedy. For tenderness, *eryngium* is useful, and where there are spasmodic conditions present, *gelsemium* is among the best agents. Where the pain is severe and continues during the interval of micturition, an opium suppository will afford relief.

Most patients, being of a neurotic temperament, will need, in addition to the above remedies, agents to improve the general health. *Nux vomica*, *hydrastis*, *strychnia*, the hypophosphites, or acid solution of iron, as may be indicated, together with outdoor exercise and a nourishing diet, will greatly assist in effecting a cure.

INCONTINENCE OF URINE.

Synonym.—Enuresis.

Definition.—A partial or complete inability to control the sphincter of the bladder, thus permitting the urine to escape.

Etiology.—Incontinence of urine, whether occurring in children who habitually *wet* the bed, or in patients of more mature years whose control of the sphincter is only partial, permitting accidents to occur, or whether it be the constant dribble occasionally seen in elderly people, constitutes one of the most disagreeable, distressing, and stubborn lesions that the physician meets.

Among the many causes may be mentioned the following: Spinal lesions, whereby the sphincteric center is involved, is known as paralytic incontinence. This form is attended by a constant dribbling of urine, and when any sudden muscular contraction occurs, as in sneezing, coughing, laughing, etc., there is a spurt of urine. The lax and weakened condition of the sphincter muscles may be due to general bodily weakness following prolonged febrile diseases.

In children it is usually due to atony of the muscular fibers closing the neck of the bladder, or to irritation of the nervous fibrillæ distributed to the mucous membrane of the bladder, preventing a normal distention of the organ.

A temporary paralysis of the walls of the bladder may result from overdistention and also from prolonged pressure of the urethra in tedious cases of labor, when the fetal head has pressed upon it for hours.

The presence of a vesical calculus may so irritate the bladder as to give rise to incontinence. Irritation from an elongated prepuce, a contracted meatus, an adherent clitoris, or from the presence of ascarides, is not to be overlooked as an exciting cause. When due to this kind of irritation, it generally gives rise to noc-

turnal enuresis, or bed-wetting. A persistent and incurable form, save by surgical measures, is due to congenital misplacement of the ureter, the opening being into the urethra or vagina.

Symptoms.—"The symptoms of this affection vary in different cases; some being able to partially retain the urine, while others have no control over it at all. In the worst cases it continually dribbles away as it is passed into the bladder, the patient being unable to retain it. As the result of this state of affairs, we find that the person is rendered filthy, and is debarred society on account of the disgusting urinary odor that he can not get rid of. There is also more or less irritation of the genital organs, and of the adjacent integument, sometimes very severe, resulting in deep, foul-looking ulcers. In other cases, it is retained to the amount of a few drams, and then commences to dribble away, unless the patient has an opportunity to void it. Again, the bladder being irritable, it is forcibly expelled after having accumulated to a certain extent, the patient having no power to resist its expulsion. Incontinence of urine at night is a troublesome affection among children, and the physician is frequently consulted about it; but, unlike the other, it usually arises from an irritability of the bladder, which, assuming control when the will is in abeyance during sleep, causes the discharge."

Diagnosis.—"There is little difficulty in determining the existence of enuresis, but care should be taken to ascertain definitely the cause. In females, a careful examination should be made to determine that the constant dribbling of urine is not consequent upon vesico-vaginal fistula."

Treatment.—Before prescribing any internal medication, a thorough examination should be made of the penis, vagina, and rectum; for it is a humiliating experience to find, after several weeks of unsuccessful medication, the incontinence to be due to an elongated prepuce, contracted urethra, or adherent clitoris, or a diseased rectum, the correction of which effects a cure.

The selection of the proper remedy will depend, as in all diseases, upon the condition present, as no one remedy will fit all cases. Where there is atony of the sphincter and abdominal walls, there is usually general debility, and the patient will need tonics, good food, outdoor exercise, and have regular habits.

Belladonna has been regarded by many as a specific, and

where there is a feeble capillary circulation, it will give good results. Combined with *nux vomica*, it is especially effective. The small dose should be used:

℞ *Belladonna*.
Nux Vomica.....aa gtt. x.
 Waterʒiv. M.
 Sig. Teaspoonful every three or four hours.

Thuja.—Professor Howe used to regard *thuja* as a specific for bed-wetters, and where there is atony, it is a splendid remedy either in nocturnal incontinence or the dribbling found in elderly patients.

℞ *Thuja*ʒi.
 Waterʒiv. M.
 Sig. Teaspoonful every three or four hours.

Nux vomica, ergot, strychnia, and like remedies, would also be suggested in cases needing tonic and stimulating treatment. Electricity is also of special benefit in these cases—the Faradic current being used—the negative pole being attached to a urethral electrode, while the positive pole will be applied over the pubes. A three-minute application should be made two, three, or four times a week.

Brisk friction along the spine with salt water is also beneficial. Where the incontinence is due to irritation, the treatment will be sedative in character.

Rhus Aromatica.—This remedy has earned a reputation for curing incontinence, and should be used in fifteen or twenty drop doses. Agrimony, hydrangia, gelsemium, bromide of potassium, and santalin will be found useful in cases due to irritability.

Whatever remedy is used, however, must be fortified by an intelligent assistance on the part of the patient. But little fluids should be taken during the after part of the day, the bladder evacuated before it is greatly distended, and at the last moment before retiring.

PART VI.

CONSTITUTIONAL DISEASES.

DIABETES MELLITUS.

Synonyms.—Saccharine Diabetes; Glycosuria.

Definition.—A constitutional disorder of nutrition, characterized by the persistent presence of grape sugar in the urine, by polyuria, and progressive loss of flesh and strength.

Etiology.—Predisposing Causes.

Geographical Location.—While diabetes is found in every country it is more prevalent in certain localities, though the reason has not been satisfactorily explained. It is quite common in Southern Italy, India, Sweden, and Germany, and may depend to some extent upon diet, habit, custom, and environments.

Race.—The racial peculiarities of the Hebrews may figure somewhat in their susceptibility to diabetes, though the cause is obscure. We only know that it occurs more frequently among the Jews than any other race.

Sex.—Of thirteen hundred cases reported by Frerichs and Seegen, nine hundred and eighty-eight occurred among males, and three hundred and fifty among females, showing a strong sexual predisposition in favor of males.

Age.—While it has been observed from infancy to old age, its occurrence before puberty is quite rare, and after the age of sixty-five, the most susceptible period being from the age of forty-five to sixty. In women it is apt to occur about the "change of life."

Heredity.—The frequency with which diabetes occurs in certain families makes it apparent that heredity plays some part as an etiological factor, thus "Seegen found it in fourteen per cent of his cases, Schmitz in twenty per cent, and Bouchard in twenty-five per cent." (Von Noorden.)

Social Position and Occupation.—That diabetes occurs far more frequently among the wealthy and cultured, and those who lead a luxurious life, than among the poor and hard-working class, is the observation of all practitioners of experience. That occupation favors the disease is shown by the frequency with which it is seen in those whose work is largely intellectual, as teachers, scientists, poets, statesmen, and those of the learned profession.

Exciting Cause.—The specific cause or causes have not yet been determined and a variety of theories have been advanced as to its origin. Extirpation of the pancreas or loss of function of this organ by disease or morbid growths, results in diabetes, and hence it seems probable that this organ plays some important part as a causal factor.

Whenever the glycogenic function of the liver is disturbed, either by organic disease of the organ or by a disturbance of its innervation by puncturing the floor of the ventricle or section of the pneumogastric, diabetes follows. Tumors of the brain, concussion, hemorrhage, shock, grief, severe mental exertion, or, in fact, whatever produces a disturbance of that portion of the medulla that presides over the glycogenic function, gives rise to diabetes.

Certain drugs produce glycosuria, notably phloridzin, chloroform, and potassium bromide. Obesity and diabetes are so often found in the same person as to suggest a close relation as to cause and effect. An effort has been made to associate the infectious fevers with diabetes, but in all probability such cases are coincidences rather than causes, and the infectious disease, by weakening the system, revealed the diabetic condition that was present previous to the attack. More recently the microbic theory has obtained some support.

Pathology.—Various lesions and degenerations are found in the various organs of the body, but how many are causal and how many the consequence of disordered nutrition would be hard to say. The pancreas is affected in more than half the cases. There may be atrophy, interstitial pancreatitis, and obstruction of the duct, cysts following obstruction from calculi or growths.

The liver is usually enlarged, showing fatty degeneration; sometimes interstitial hepatitis prevails, and again abscesses are observed. The spleen is usually atrophied. The heart is pale,

flabby, and there may be fatty degeneration. Pericarditis and endocarditis have been noted, and arterio-sclerosis is not a rare condition in diabetes. The lungs share in the general breakdown, and gangrene frequently follows pneumonia. Tuberculosis of the lung is not uncommon. Pleural effusions are sometimes found.

The kidneys are enlarged and show fatty or hyaline degeneration. Interstitial nephritis is frequently present.

Various changes are seen in the brain and cord. There may be softening or thickening of the membranes, but the most constant lesions present are those affecting the medulla or fourth ventricle. The blood contains a larger per cent of sugar than during health. There is generally extreme emaciation, although in some cases the subcutaneous fat is found in considerable quantities. A bronzed condition of the skin is not uncommon.

The eye is usually involved in the advanced stages; cataract attacking by preference young subjects. Of retinal changes, Von Noorden, in "The Twentieth-Century Practice," says: "Those which are dependent upon diabetes occur under three forms: (a) Albuminuric retinitis, accompanying contracted kidney, present as a complication or sequel of diabetes; (b) Retinitis centralis punctata, with characteristic ophthalmoscopic changes (small, shining central spots, usually with hemorrhagic puncta, always bilateral, without involvement of the optic nerves—Leber, Hirshberg); (c) Retinitis hemorrhagica of the ordinary type.

Symptoms.—Two varieties are seen, the acute and the chronic. The general symptoms are very much the same in the two forms, the principal points of difference being in the age of the subject and the method of onset of the disease; the acute, usually occurring in children and young adults, while the chronic form occurs most frequently after the age of fifty. The acute form comes on more rapidly than the chronic form; the latter comes on so slowly and insidiously that the disease is well advanced before the patient is aware that he is its victim. Among the first symptoms that attract the attention of the patient is that he is losing flesh and strength, and that he has frequent calls to void water, and in the morning he is surprised to find so large a quantity in the vessel. There is no pain save a weight in the loins, and the appetite is good; indeed, in many cases, it is voracious. Digestion seems unimpaired, yet the patient continues to

grow thin, and prostration is marked; *muscular weakness* is characteristic.

Thirst is a characteristic symptom, the patient drinking large quantities of water during both day and night. The large quantity of water seems to be necessary to hold the sugar in solution for excretion, the demand for water beginning an hour or two after a meal. The quantity of water consumed has a direct ratio to the quantity eliminated.

The skin may be doughy and relaxed, although usually it is dry, harsh, and constricted. Pruritus is a distressing symptom, and is especially aggravated about the genitals, when the diabetic urine comes in contact with the parts. Boils, carbuncles, and eczematous eruptions are common. The hair becomes dry, and loses its gloss, and the nails become brittle and easily broken.

The tongue is dry, red, and glazed, or covered with dark sordes. The mouth is dry and sticky and the secretion of saliva is diminished.

The urine varies in quantity from four to twenty pints, although in rare cases it may be normal in quantity. It is pale, almost as clear as water, and has a specific gravity, ranging from 1,025 to 1,050, although in rare cases it may go as low as 1,013. It has a peculiar sweet odor and taste, and an acid reaction. Albumin is sometimes present before sugar appears in the urine, and uric acid is found in excessive quantities.

Tests for Urine.—See Glycosuria, page 683.

Pulmonary Complications.—These are not uncommon in the advanced stages, pulmonary tuberculosis being quite frequent, and pneumonia is often seen. The special senses may become impaired; thus the vision becomes disordered, not only by a weakening of the muscles of accommodation, but also in some cases by cataract formation. Otalgia, otitis media, and mastoid affections occur. The senses of taste and smell are also affected in some cases.

Diabetic coma occurs in about half of the fatal cases. It may come on suddenly but a few hours before death, or it may be announced by a peculiar fruity odor of the breath, gastric disturbance, and headache. Emaciation is quite rapid after these symptoms, and death soon follows.

Peripheral neuritis, characterized by neuralgia and a numb, tingling sensation is not uncommon, while diabetic tabes may

occur, and is characterized by darting pains, absence of the knee-jerks, and loss of power in the extension of the feet, giving the peculiar tabetic gait—steppage.

The course of the disease varies according to the age of the patient and the form of the disease. Thus in the young, and in the acute form, the disease lasts from a few weeks to two years, while in those past middle life and where the patient is obese, the disease may last for years.

Diagnosis.—The diagnosis is very readily made; muscular weakness without apparent cause, the passage of large quantities of water, itching of the genitalia, loss of flesh and strength, great thirst, hunger, and loss of sexual power, are so characteristic of diabetes that an analysis of the urine will scarcely be necessary for a positive diagnosis.

Prognosis.—Diabetes is a very grave disease, and although some cases recover, a large per cent will terminate fatally. A complication that frequently carries off the patient is pulmonary phthisis.

Treatment.—The treatment may be divided into three parts: Dietetic, hygienic, and medicinal.

Dietetic.—Since the greater portion of glucose that enters the blood is derived from the carbo-hydrates, sugar and starch, such articles of food as are rich in these substances should be excluded from the patient's diet. Saccharin and glycerin have been recommended as a substitute for sugar, but the taste is so disagreeable to most persons, that it can not be substituted to any great extent. The following articles are to be prohibited: Such fruits and vegetables as are rich in starch and sugar should be restricted, and include the following:

Vegetables—Potatoes, rice, beans, peas, carrots, beets, onions, lentils, turnips, squash, tomatoes, asparagus, parsnips, artichokes, corn, hominy, sago, arrow-root, oatmeal, and cracked wheat.

Fruits—Bananas, pears, grapes, apricots, apples, plums, strawberries, raspberries, gooseberries, sweet cherries, figs, and chestnuts.

Meats—Livers of animals, mollusks (oysters, clams, etc.), and the inside meat of clams and lobsters.

Fluids—Sweet wines, chocolate, and cocoa, if sweetened,

lemonade, beer, cider, champagne, and aerated drinks, such as ginger-ale, root-beer, etc., and alcohol.

Foods Permissible.—Vegetables—Cucumbers, water-cresses, lettuce, cabbage, sorrel, mushrooms, spinach, celery, chicory, and various pickles, unless sweet.

Fruits—Lemons, oranges, currants, grape-fruit, and nuts (chestnuts excepted).

Meats—All kinds of fresh meats, poultry, fish, game, bacon, ham, and large quantities of fat, butter, eggs, and cheese.

Bread—The crust, thoroughly toasted, of a French roll and gluten biscuit.

Beverages—Coffee and tea, if not sweetened, sweet milk, buttermilk, plenty of pure water, and the alkaline mineral waters.

By observing a diet of this kind, the sugar is reduced to the minimum and often disappears. We are to remember, however, that the strength of the patient must be maintained, and many times we will have to modify our diet and permit, in moderate quantities, articles on the above-mentioned restricted list. We are not to sacrifice the strength of the patient by a too rigid diet.

Hygienic.—The patient should take light exercise in the open air, and, when too weak to do this, should be well massaged; daily baths, hot or cold, according to the strength and age of the patient should be taken. The sleeping apartment should be well ventilated and flannels worn the entire year. All mental worry and excitement should be avoided, and, where possible, the patient should live in an equable climate.

Medicinal.—The medicinal treatment of this disease has not been very successful. Von Noorden says, "The number of drugs which have been recommended in the treatment of diabetes is legion; the evidence of the small benefit of any individual, one." Of *syzygium jambolanum* (the bark and seeds of the Java plum) which have been so highly extolled, he says, "I have never seen any results worth mentioning from the use of this drug." The agents most frequently employed are iron, opium, arsenic, nitrate of uranium, creosote, and the bromides.

Lycopus.—In 1873, Dr. D. Ray read a paper before the Yolo County (California) Medical Society, on Diabetes, recommending *lycopus*. He says of a case, "For weeks I had given her iron, opium, bitter tonics, and astringents, with a host of the remedies recommended by authors, from Dr. Prout down to Flint, and

without any benefit, when my attention was called to bugle weed as an agent for diabetes. The administration of fluid extract of bugle weed, a teaspoonful five times a day, soon effected a cure." Since then others have reported favorably upon its use.

Rhus Aromatica.—Dr. Goss in his "Practice of Medicine," speaks highly of this agent in the treatment of diabetes.

Chionanthus.—Dr. Hauss read a paper at the National Association in 1901, extolling the virtues of chionanthus in this stubborn disease. A study of Eclectic remedies promises more in this affection than those so long recommended.

DIABETES INSIPIDUS.

Synonyms.—Polyuria; Hydruria; Hyperuresis; Diuresis.

Definition.—A constitutional disease characterized by an excessive flow of urine of low specific gravity, and devoid of sugar and albumin, thirst, and loss of flesh and strength.

Etiology.—Age predisposes to diabetes insipidus, it being more frequent during childhood and early maturity, the disease becoming more rare after reaching the age of thirty. Heredity also plays an important part. Weil notes twenty-three cases in a family running back four generations. It has occurred during convalescence of acute infectious diseases, and is often associated with abdominal tumors, tuberculosis, and syphilis. The ingestion of large quantities of water or malt liquors, is not infrequently followed by polyuria.

Disorders of the nervous system, however, are more largely responsible than all other causes combined. Bernard discovered a spot in the floor of the fourth ventricle of animals, which, when irritated, is followed by polyuria. Tumors of the brain, blows on the head, great mental excitement, fright, sunstroke, apoplexy, and paralysis of the sixth nerve, have all been followed by diabetes insipidus. Epileptics not infrequently have this lesion.

Pathology.—No characteristic anatomical lesions are found. In some cases the bladder is hypertrophied owing to constant overdistention. The ureters and pelvis of the kidneys have been found dilated, due to backward pressure due to an overdistended bladder. The kidneys are sometimes enlarged and congested.

Various lesions of the nervous system have been found, but none peculiar to polyuria.

Symptoms.—Diabetes insipidus may come on gradually or develop suddenly. When due to shock or traumatism, it develops quickly, otherwise it is insidious in its appearance. The patient's attention is first attracted to the disease by the frequent calls to urinate and the large quantity voided, and that he is compelled to micturate several times during the night. The urine is clear, light in color, and of *low* specific gravity, ranging from 1,001 to 1,008, and varying in quantity from three to thirty quarts every twenty-four hours. Thirst is a prominent symptom, and large quantities of water are consumed. The mouth, owing to deficient secretion of saliva, becomes dry, and the skin is dry and constricted. Usually there is but little disturbance of the digestive system, although persistent constipation, due to the excessive quantity of water voided, is a common feature.

The only complaint made by the patient is that of aching in the loins and weariness on slight exertion. Although there is gradual loss of flesh, there is not the emaciation that is seen in diabetes mellitus. The surface and the extremities are inclined to be cool, and a subnormal temperature is not uncommon.

The course of the disease depends to a great extent upon the primary lesion. Where due to tuberculosis, or organic disease of the brain or abdomen, the general health fails, the patient becomes much emaciated, and the disease terminates fatally in from a few months to one or two years, while in idiopathic cases, the patient may live for years in comparatively good health.

Diagnosis.—The large quantity of urine voided, the *low* specific gravity and absence of sugar, enables one to recognize diabetes insipidus from diabetes mellitus, and the continued polyuria day after day enables one to recognize it from polyuria due to hysteria, which is always more or less transient.

Prognosis.—When due to organic lesions of the brain or abdomen, the prognosis is unfavorable. If idiopathic, the patient may live for years and enjoy comparatively good health, and a good per cent of cases will entirely recover.

Treatment.—The idiopathic form of the disease yields readily to medication, which is simple and positive.

Belladonna.—A belladonna plaster is ordered across the loins,

and the specific tincture of belladonna given internally. Ten to fifteen drops of the specific tincture are added to four ounces of water, and a teaspoonful given every three hours. Where there is a feeble capillary circulation, this remedy will not disappoint in its action.

Rhus Aromatica.—This is an excellent remedy in polyuria, but should be given in fifteen to twenty drop doses, four times a day. Ergot in drop doses every hour is also a good agent in many cases. A general tonic treatment is frequently very beneficial in bringing about a cure. In addition to the tonic diuretics, hydrangia, collinsonia, hamamelis, achillea, and like remedies, the administration of the compound tonic mixture (the triple phosphate of iron, quinia, and strychnia), in half teaspoonful doses, will give good results.

The diet should be nourishing, but easily digested, and as little fluid taken as is consistent with good health. Moderate exercise in the open air, and a sponge-bath daily, is to be advised. An equable climate assists materially in effecting a cure.

LITHEMIA.

Synonyms.—Uricacidemia; Uricemia; American Gout.

Definition.—A condition of the blood in which there is an excess of uric acid, due to a disturbance in cellular metabolism, and characterized clinically by various digestive, circulatory, genito-urinary, and nervous phenomena.

Etiology.—Dr. DaCosta tersely defines lithemia when he terms it a condition “in which the increase of nutriment is in excess of the output of waste.” As a result of luxurious living, the consumption of rich foods, and drinking freely of fermented and malt liquors, there is introduced into the system more nitrogenous material than can be oxidized, especially since this class usually lead a sedentary life, and muscular exercise is deficient. As a result, uric acid increases, which for a time may be eliminated by the excretory organs; but sooner or later, the kidneys, lungs, skin, and bowels are unequal to the contest, and disturbances of the stomach, bowels, circulation, and nervous system, result.

We may have uric acid in excess, however, in persons of

modest living. In such individuals there is feebleness of the digestive apparatus, which gives rise to the same conditions,—imperfect oxidation and disturbed metabolism.

Defective capillary circulation must be considered a cause, the correction of which is so often attended by rapid improvement of the usual phenomena.

Heredity must not be overlooked as a predisposing factor; the patient coming into the world handicapped by enfeeblement of every organ, lithemia naturally results.

Pathology.—Osler has well said that, "In the present imperfect state of knowledge, it is impossible to define with any clearness the pathology of the so-called uric-acid diathesis."

The disturbed metabolism, if continued for a great length of time, finally leads to arterio-sclerosis, renal diseases, and degenerations, usually fibroid, of the various other tissues.

Symptoms.—The symptoms due to uric acid diathesis are legion, many of them quite vague. The principal ones are related to the digestive, nervous, and circulatory systems, although the skin and genito-urinary organs show more or less characteristic symptoms.

Gastro-Intestinal.—Among the most frequent symptoms are those of dyspepsia. The appetite is variable; at times perverted, again voracious. The tongue is usually coated; there is an offensive breath, acrid eructations, sense of weight in the epigastrium, flatulency, nausea, and sometimes vomiting. Constipation is the rule, although diarrhea is not uncommon. Hemorrhages are usually present. A troublesome and unpleasant feature is the frequency with which stomatitis attends the disease, usually of an ulcerative character.

Cardio-Vascular Symptoms.—Palpitation is the first symptom to announce disturbance of the vascular system, and although at first due to flatulency, occurring shortly after a meal, it is not long before it disturbs the patient's rest at night. Arterial tension occurs later, followed by contraction of the arteries—arterio-sclerosis.

Nervous Symptoms.—Headache is one of the most frequent symptoms of uric acid diathesis. It may be occipital, general, or affect but one side of the head—hemicrania. Insomnia is common, and the patient is often restless and irritable, finally lead-

ing to depression and melancholy, and not infrequently to suicide for relief.

Genito-Urinary Symptoms.—The urine is high-colored and generally of high specific gravity, 1.025 to 1.035, and, on cooling, deposits a brick-dust sediment—uric acid. Urea, oxalate of lime, and the phosphates are often present. Albumin and tube-casts are sometimes found. The acrid urine sometimes gives rise to cystitis and urethritis.

Cutaneous Symptoms.—The skin becomes dry and constricted, to be followed by severe pruritus and various cutaneous eruptions.

Diagnosis.—The frequent and persistent headache, gastric disturbances, high-colored urine depositing a brick-dust sediment, uric acid, and rich in the phosphates, render the diagnosis comparatively easy. The absence of joint symptoms enables us to differentiate lithemia from gout.

Prognosis.—When recognized early, judicious treatment should result in complete recovery. Where arterio-sclerosis has developed, or where degeneration of the kidney and liver has taken place, the prognosis is of course unfavorable.

Treatment.—Dietetic and hygienic measures are a very important, if not the most important, part of the treatment.

Any outdoor exercise that will bring into play the greatest number of muscles, should be indulged in regularly and systematically. Well-regulated exercise increases respiration, and the intake of oxygen helps materially in the burning of nitrogenized tissues. In lithemia, oxidation is defective, hence the need of systematic exercise. When the patient is financially able to carry out the prescription, sea-bathing is one of the best forms of exercise, since every part of the body is brought into play. An ocean voyage is beneficial, if systematic exercise is taken daily while on shipboard. For the stay-at-home people, golf, tennis, dumb bells, Indian clubs, rowing, breathing exercises, etc., should not be neglected.

Diet.—As a rule the diet should consist largely of milk, fruit, and vegetables, although no diet will suit all cases. In general, red meats should be excluded, and pork positively forbidden. Broiled or baked fish may occasionally be indulged in, and the white meat of chicken. Shell-fish can usually be allowed. Eggs,

poached or soft boiled, may be served occasionally. Dried beans and peas contain more nitrogenous matter than beefsteak, and should not be used often. Fruits should be freely eaten, unless of a very acid character, like sour cherries, plums, etc. The cereals may be eaten freely, especially rice.

Plenty of pure or alkaline water should be taken. London-derry lithia water is especially to be recommended. Alcoholic, fermented, and malt liquors are to be prohibited.

The patient should be relieved of work and severe mental worry as far as possible.

The daily bath should be emphasized; the cold bath with brisk friction for the young, active, and robust. The hot bath for the feeble and elderly patient.

Medicinal; Hydrangea.—This agent has long been used in lithemia, and where there is pain in the loins and irritation of the urethra and bladder, with red sandy deposit in the urine, the agent will give good results. Hydrangea one dram, to water four ounces, a teaspoonful every one, two, or three hours should be given. The wrongs of digestion will usually be corrected by a carefully selected diet, although nux vomica, ipecac, rhus tox., hydrastis, and hydrochloric acid may be needed before the normal condition is attained.

Epigea Repens.—Where there is excess of uric acid as shown by the brick-dust deposit, backache with nausea, and marked congestion of the kidneys, epigea will increase the flow of urine, flush out the detritus, and give marked relief. Of the specific tincture, ten to fifteen drops may be given in an ounce of hot water, to be repeated every two or three or four hours. An infusion usually gives better results than does the tincture.

Polymnia.—Where there is enlargement of the spleen, with engorgement of the portal circulation and mesenteric glands, and but little or no pain, the tissues full and doughy, *uvvedalia* one or two drams, to water four ounces, will give good results.

Ceanothus.—Where there is puffiness of the face, doughy and relaxed skin, with pain in the spleen and liver, two to ten drops of ceanothus in a little water every two or three hours will prove beneficial.

Carduus Marianus.—When the patient is despondent bordering on melancholy, feeble capillary circulation, enlarged spleen and liver, carduus is the indicated remedy.

Chionanthus.—Engorgement of the liver with jaundice calls for *chionanthus*.

Grindelia Squarrosa.—Where there is long-standing dyspepsia with enlargement of the spleen, and the patient sees only the dark side of life, Professor Mundy declares that, for this patient, there is nothing equal to *grindelia squarrosa*.

Piperazin has been found of marked benefit in some cases.

Lithium Benzoate.—Where the urine is loaded with phosphates, mucus, and pus, with irritation of the bladder and urethra, and where there is tenesmus and burning, benzoate of lithium should be given.

Lithium Salicylate.—If there be rheumatic pains, and the urine is loaded with the brick-dust deposit, the salicylate of lithium will be the better preparation.

Where the capillary circulation is feeble and there is nervous waste, it is well to examine the rectum for hemorrhoids, pockets, papillæ, and other wrongs. Also sound the urethra; for when there are wrongs of these parts, but little benefit can be expected from medicine till they are removed.

The alkaline mineral springs will be visited by many with much benefit. Travel, change of climate, and absence from business and the worry of life, will do much towards a cure. In all cases, the individual case needs especial study, and such remedies as may be needed from time to time must be promptly administered.

RHEUMATISM.

Definition.—A constitutional disease, of unknown etiology, characterized by inflammation of the locomotor apparatus, accompanied by great pain and tenderness, with tendency to change from one part to another—metastasis.

Rheumatism is divided into acute, subacute, and chronic.

Pseudo-rheumatism, into gonorrheal and muscular.

Etiology.—Many theories have been advanced from time to time to prove the specific character of the disease, each with a fair show of positive evidence to confirm the particular view held by the advocate. There are *three principal* theories to which the

medical world has been generally committed, and each of which has had many supporters:

(1) *The Chemical Theory*.—This for a long time was the generally accepted factor in the production of rheumatism. In the metabolic changes that are constantly taking place, a perversion of the retrograde metamorphosis occurs, giving rise to lactic acid, and possibly other compounds, which so irritate the various tissues of the locomotor apparatus that rheumatism follows. The acid perspiration and urine seemed to confirm this view. This theory, however, is being largely abandoned, as it is now known that some cases of rheumatism show a defect in the acids of the body, and that such patients are benefited by an acid treatment. That, in many cases of this disease, there is an excess of lactic and uric acid, however, is well known.

(2) *The Nervous Theory*.—It is an established fact in pathology that joint troubles occur as a sequence to lesions of the nerves and nerve centers. Charcot, Brown-Sequard, and others have called the attention of the profession to this point. Dr. J. K. Mitchell, of Philadelphia, as early as 1831, called attention to joint changes following injuries of the spinal cord, and his son, Dr. Weir Mitchell, has written on the same thought.

(3) *The Infectious Theory*.—The belief that the cause is microbic in origin, therefore infectious, is receiving a large following. Various germs have been found in the blood-serum and synovial fluid of the affected parts, though no constant variety has been uniformly present. Recent experiments, in which cultures from organisms taken from rheumatic nodules reproduced polyarthritis and pericarditis in the rabbit, seems quite significant. The fact that it quite often occurs in epidemic form also tends to confirm the view that it is infectious.

Predisposing Causes.—*Sex*.—In young children, girls are more frequently affected than boys, while in later life the male sex is more liable, on account of more frequent exposure.

Age.—The most susceptible age is from fifteen to twenty-five years, though no age is exempt.

Season.—The months of February, March, and April, when there are sudden atmospheric changes, predispose to the disease.

Occupation.—All occupations which are attended by exposure to the weather, such as those of drivers, sailors, soldiers, and outdoor laborers, predispose to rheumatism, and those requiring

great exertion, followed by rapid cooling of the body, as iron-workers, boiler-makers, foundrymen, yeast-makers, and brewers.

Heredity.—There is a hereditary tendency to the disease, and it is quite common to find several in a family rheumatic.

Sudden Exposure.—The chilling of the surface by sudden exposure in inclement weather is frequently traced as a causal factor in the disease. One attack of rheumatism predisposes to further attacks.

Pathology.—There are no characteristic changes peculiar to rheumatism, unless we except the lesions of the heart, where this organ becomes complicated. Most patients recover without permanent lesions of the joints, notwithstanding the great amount of swelling during the progress of the disease. During an attack, there is hyperemia of the joints and synovial membrane, attended by swelling of the joints and ligamentous tissue. There is often an increase of the synovial fluid, which may become turbid owing to the presence of fibrin flakes and leukocytes, though pus and blood are rarely found. There is marked anemia, the red corpuscles rapidly disappearing, while the hemoglobin may be reduced one-half and leukocytosis is quite common. In quite a large per cent of cases the serous membranes of the heart are involved, giving rise to endocarditis, pericarditis, and myocarditis; the left side is more frequently affected. The pleura and lung may also show changes, the result of complications.

ACUTE ARTICULAR RHEUMATISM.

Synonyms.—Inflammatory Rheumatism; Rheumatic Fever, Acute Rheumatism.

Symptoms.—Incubation.—The period of incubation is short and not characteristic. There may be prodromal symptoms, consisting of malaise, stiffness, painful condition of the joints, and sore throat, especially tonsillitis. Usually, however, the disease is ushered in with chilly sensations, or even a rigor. The fever rapidly rises to 103° or 104° ; there is not only pain in the head and back, but soreness of the whole body; the skin is hot, though often moist; the tongue is white and furred, the bowels constipated, and the secretion from the kidneys scanty, high-colored,

and excessively acid; the pulse is full and frequent, ranging from 100 to 140 beats per minute.

With the advent of the fever, a joint, usually the knee, ankle, elbow, or wrist, begins to swell and becomes red, hot, and exquisitely painful. If the joint is moved, the patient cries out with pain, and even the presence of the bedclothes may cause suffering. The fever may run quite high for several days, and then gradually decline. The mind remains clear save when the temperature is excessively high.

Some time during the twenty-four hours, usually at night, the patient breaks out in a profuse perspiration, which is of a sour odor, and is often attended by sudamina and miliary vesicles. These daily or nightly sweats leave the patient quite prostrated for a time; after twenty-four or forty-eight hours of heat and pain in a joint, the swelling begins to subside, the color and pain disappear, and the part, though tender, takes on a normal appearance; but, to the disgust of patient and physician, the swelling, heat, pain, and redness occupy the attention of its opposite fellow, or perhaps another member on the same side. Thus it may go from joint to joint, or alternate with the part first affected. The swelling varies, usually confined to the joint, though often involving the sheaths and tendons.

The blood-changes are very marked, few diseases showing the marked anemia of rheumatism. The duration of the disease is variable, and no one can tell at the beginning of an attack whether it will terminate in six days or six weeks. It is one of the most painful and distressing of all diseases. Day after day the patient may lie with a red, puffy, and tender joint, unable to move it without the greatest pain, and, to add to his discomfort, a profuse, sour sweat occurs, the odor of which adds to his misery. As the days pass, the sweat loses its acidity, and may even become alkaline.

The heart may early feel the force of the infection, and the murmur in the apex region is the note of warning. This organ should be examined daily that we may be prepared with treatment to modify the force of the disease.

"In *subacute rheumatism* there is usually but little fever; the pulse may be increased five or ten beats per minute, and be more full and bounding or hard, the skin harsh and dry, the tongue coated, the appetite somewhat impaired, bowels constipated, and

the urine scanty and deeper colored. These symptoms follow instead of preceding the local affection.

"One or more parts may be affected, the larger joints suffering most frequently, the smaller ones next, and the aponeurotic expansions and muscles least. When a part is attacked, it commences to swell, and becomes hot and painful, though in many cases it is not reddened. The pain, as in the preceding cases, is gnawing, tearing, tensive, and contusive, or lancinating, though usually not so severe as in the acute form. It does not change its position so frequently, but still a metastasis is not uncommon. It is full as stubborn as the more acute malady."

Complications.—The most serious and really the only complications that need be considered are those affecting the heart, occurring most frequently in the acute form, though found both in the subacute and the chronic. It occurs far more frequently in the young than in those past middle life. Dr. Peacock found that thirty-three and a third per cent occurred under twenty-one years of age, and only sixteen and sixtenths per cent after forty years of age.

The left heart is nearly always the seat of the lesion, for the same reason that the larger joints are almost invariably the seat of the local trouble; viz., greater functional activity.

Formerly it was supposed that the cardiac lesion was the result of a metastasis from some other part, but this idea has given way to the more rational one of similarity of structure to that of the joints; viz., fibrous and serous, and though the structure of the right heart is the same as that of the left, there is much less functional activity of the right. Its walls are thinner, and there is less tendinous material in its valves. The work is not so severe and the strain not so great. It has been determined that the left heart bears three times the strain of the right; hence the greater functional activity and greater susceptibility to inflammation.

Endocarditis.—This is the most frequent as well as the most serious complication, for it involves the mitral segments, and, though rarely dangerous, it is apt to set in motion changes which result in chronic valvular troubles, that influence the heart's action throughout life. With each attack of rheumatism, the liability to this complication increases.

The symptoms are rather vague, and many times are over-

looked. An increased frequency of pulse, and an increased temperature without an increase of the local joint affection, should arouse suspicion and turn our attention to the heart.

Pericarditis.—This is rarely found as a primary disease, but follows various infectious lesions, and, in from sixty to eighty per cent, can be traced to rheumatism, and though one of the most common of complications, like endocarditis, is often overlooked during life, and only revealed post-mortem while searching for other lesions. It may occur with endocarditis or independently of that affection.

Myocarditis.—This is not so common a lesion, and when it does occur, is preceded by the above-mentioned complications.

Diagnosis.—"We have but little trouble in making the diagnosis of rheumatism, the swelling, heat, and peculiar character of the pain being generally sufficient. It is true that, in cases of disease of the bones or of the cartilages or synovial membrane of a joint, it is sometimes almost impossible; yet the character of the pain, the general condition of the system, and the fact that rheumatism is rarely confined to one point, will frequently enable us to decide.

"Rheumatism of the back, or lumbago, is sometimes mistaken for disease of the kidneys or spinal cord; but if we recollect that, in disease of the kidney, we will usually have retraction and pain in the testicle, change in the character of the urine secreted, and more or less constitutional disturbance peculiar to suppression of the urine, and that in disease of the spinal cord to this extent, we would have disturbance of all the nerves given off below, we will not readily make the mistake.

"Neuralgia is very frequently confounded with rheumatism, and it is sometimes almost impossible to distinguish them; but in a majority of cases, the pain, being exquisitely sharp, tearing or lancinating, and in the course of a nerve, will enable us to see that it is neuralgia."

Gout usually occurs in the smaller joints, preferably the great toe; then the age, habits, and history of onset will help us in recognizing the one from the other. We can distinguish rheumatism from arthritis, by the history of pyemia, and the inflammation terminating in suppuration, and the more or less destruction of the joint.

Prognosis.—This is nearly always favorable, for though the heart complications are frequent, they rarely cause death. Our prognosis, therefore, is favorable as to life, but uncertain as to length of time the disease will run; for of all diseases that affect the human race, rheumatism is the most uncertain. Some very severe forms will yield in eight or ten days, while others seemingly not so severe will run eight or ten weeks.

Treatment.—Specific medicines yield better results than the so-called rheumatic combinations, and if a careful selection is made according to specific conditions, the majority of cases will yield more speedily than under the old regime.

The patient should be placed between blankets, and wear a flannel night-dress, with the sleeves open from shoulder to wrist, that we may readily get at elbow and wrist. The patient is less apt to take cold after profuse sweating if protected by flannel.

Locally, the part should be wrapt in cotton, or what is better, raw wool. Where the pain is great, chloroform liniment is often of much benefit. A favorite local remedy is camphor and turpentine, of each one ounce, and alcohol two ounces.

If seen early, the old alcohol sweat is of great benefit. Have the patient disrobed and placed on a *wooden* bottom chair, with a blanket covering him from the neck to the floor. Place four ounces of alcohol in a cup, which should be set in a pan of water, and this placed under the chair; have the patient's feet in a deep bucket of hot water; light the alcohol, and the patient will soon reach the sweating stage. Allow the patient to drink freely of cold water; the perspiration will soon start from every pore, and after ten or twenty minutes of this treatment, place the patient in bed with hot-water bottles to feet, and in a few minutes the patient falls into a quiet sleep. Where this is carefully followed, I know of no treatment which will so successfully cut short the disease.

Internally, for the full, strong pulse, I use veratrum in full doses, say thirty or forty drops to half a glass of water, to which I add sulphate of morphia, a half grain. This overcomes the nausea occasioned by the veratrum, and also assists in relieving pain. To the sedative may be added bryonia, five to ten drops, especially where the pain is lancinating in character.

Where there is great muscular soreness, use *macrotys*, and give in rather large doses, say one or two drams to half a glass

of water. Dr. Webster speaks very highly of *rhamnus californica* in stubborn cases, and from what I have seen of its effects, I like its action very much.

Where the parts are swollen and there is edema, *apocynum* is the remedy, and if there arise heart complications, it is the remedy par excellence. I know of no other remedy which can equal it under these conditions; the decoction gives the best results.

Where the tongue is broad and full, and there is puffiness under the eyes, potassium acetate will give good results. A good combination is salicylic acid one dram, potassium acetate four drams, water four ounces; a teaspoonful every four hours, the patient drinking freely of water after each dose.

Where the tongue has a pasty, dirty fur upon it, a saturated solution of sodium sulphite gives good results; but if the tongue be white, but clean, sodium salicylate in five-grain doses every three hours will replace the sulphite.

Often we have the red tongue and mucous membrane; here muriatic acid takes the place of the alkali; lemon-juice is also grateful and beneficial.

Where the pain is unbearable, a hypodermic of morphia may be necessary to give relief, but this should be avoided, except in extreme cases. Blisters should be discarded, for while they may give temporary relief, the after effects are so painful that the good is counterbalanced by the suffering.

The diet should be light, milk in some form being the best, cow's milk, malted milk, broth, whey, or koumiss. Where the patient can not take milk, broths may be substituted. Avoid meats and starchy and sweet foods till all fever disappears and secretions are fully established.

The treatment for the subacute form will be very much the same, minus the sedatives, and even here there may be indications for the small dose. Gentle massage will often afford much relief.

CHRONIC ARTICULAR RHEUMATISM.

Synonym.—Chronic Rheumatism.

Definition.—A chronic articular disease of the joints, developing insidiously, or following the acute or subacute forms. It

usually affects two or more joints, and is most likely dependent on the same conditions which give rise to the acute forms.

Etiology.—There are several predisposing causes, such as,—

Age.—This is a lesion almost invariably occurring after middle life.

Sex.—Females are more prone to the disease than males.

Environments.—One's surroundings materially predispose to this condition. Where the dwelling is low and damp, the rooms dark and poorly ventilated, and where poverty necessitates poor and illy prepared food and insufficient clothing, exposing the patient to all kinds of weather, there is a tendency to the disease.

Heredity.—Heredity may also operate in favor of bringing about conditions favorable for its development. "In some cases it has its origin in imperfect digestion and assimilation, which we would readily account for, on the theory that an increase of lactic acid was the cause of the disease.

"In others it seems to have arisen from, and is dependent on, deficient action of the excretory organs, and possibly on some changes in the process of retrograde metamorphosis, by which the broken-down tissues are converted into material fit for excretion; and in others, upon some derangement of innervation." There is but little doubt that the same causes which give rise to the acute and subacute forms are actively at work in producing this form of the disease.

Pathology.—"When the joints have been the seat of the disease, we find them variously altered. In some cases there seems to be nothing but an increase of the synovia; in others the synovial membrane is thickened, especially the false ligaments; in some cases roughened, covered with shreds of false membrane, or adherent, coagulable lymph, and the synovia more or less viscid, shreddy, and in some cases purulent. The articular cartilages are sometimes softened, at others eroded, and in some cases completely destroyed. The articular extremities of the bones are not infrequently enlarged, and the ligaments, tendons, and muscles contracted or relaxed. When affecting other parts, if of long duration, it may so change their structure as to leave little resemblance to their original condition."

Symptoms.—Dr. Scudder so clearly describes the disease that I will quote him in full: "As regards the general health of the

patient, we find that it varies greatly in different cases. In some there is a manifest derangement of the stomach, various unpleasant sensations, as of fullness, pain, acidity, flatulence, etc., occurring after a meal, and showing that digestion is not well performed. In such cases we find the patient reduced in flesh and strength, and exhibiting evidence of marked general cachexia. In others, the secretions are manifestly at fault, the kidneys acting poorly, or the skin is harsh and dry, or relaxed and flabby, and the bowels irregular. It is true that we find cases of chronic rheumatism in which we can not detect the slightest lesion, except the local rheumatic disease; what loss of flesh and strength there is being attributable to the continued suffering and loss of rest resulting from it; metastasis occurs in the chronic as well as the acute disease.

"It most frequently affects the articulations, they being swollen, tender, and painful; one or more may be affected at the same time, usually not more than two, and the amount of swelling, discoloration, and pain varies in different cases; sometimes the tenderness and pain are exquisite; at others it is not very marked. The articulation is in some cases entirely useless, motion or pressure giving rise to severe suffering; at others, though lame, it may still be used. In some cases it takes the form of synovial dropsy, it being very evident that the enlargement is almost entirely dependent upon effusion into the joint; at others, the enlargement seems to be dependent upon material within the synovial membrane, but it is not nearly so mobile as before. In other cases there is marked enlargement of the articular extremities, or a dull, heavy, gnawing pain, with great tenderness, when the bones are placed so as to give rise to pressure on their extremities. In other cases the deposit is undoubtedly outside, involving ligaments, tendons, and muscles that pass between the two bones, causing relaxation in some cases, contraction in others, thus giving rise to deformity. In some cases this is very marked, bones being dislocated, or tendons so shortened as to produce unnatural flexion or extension, or to change the position of the bones, as in the case of the knee-joint, the articulation of the tibia being so changed as to produce knock-knee, and turn the toes outward; or, in the case of lumbago, or rheumatism of the dorsal or lumbar portions of the spine, giving rise to spinal curvature and other distortions. If it attacks a group of muscles, we may find

them gradually shortening, until a limb is rendered entirely useless, as in the case of contraction of the hamstring muscles, and flexion of the knee, and finally terminating in the almost entire change of the muscular structure."

Diagnosis.—This is usually not difficult, the history of the case materially assisting in determining the disease. In gout, the pain is confined to smaller joints, and the pain is not aggravated by a change of weather.

Prognosis.—This is not favorable so far as effecting a cure is concerned; for unless the disease is seen in its incipency but little can be expected in the way of a radical cure. However, medication mitigates the suffering and improves the general health. Very few die from the disease.

Treatment.—Where the patient has the means, a change of climate will often prove of great benefit. A visit to Southern France or Italy, or our own Southern California, or the dry, warm atmosphere of Arizona, often works changes that can be accomplished in no other way. A sojourn at Hot Springs, Arkansas; Martinsville, Indiana, or the various mineral springs to be found in the various States, will do more for a patient in a few weeks or months than years of ordinary medication.

Of the various anti-rheumatics, a few deserve especial mention. Apocynum, in the form of a decoction, has been one of the best remedies I have ever used. Where there is edema, slight or aggravated, it has few, if any, equals. Commence with ten-drop doses, gradually increasing the dose to a teaspoonful if the stomach will retain it. The one serious objection to the remedy is its intense bitter quality and the sense of nausea it produces, many patients being unable to retain it. Where there is heart complication, it is one of the best remedies at our disposal.

The alkaline diuretics, potassium acetate, citrate, or nitrate, will be found useful where we desire to stimulate metabolic changes, and thus fit the poison to be better eliminated by way of the kidneys. Dr. Webster speaks highly of *rhamnus californica* and *grindelia squarrosa*; of the other many remedies which may be used, I will only add, when the conditions present call for their use, of course administer them. Many cases will need other remedies than the anti-rheumatics.

Wrongs of the stomach need to be corrected, for a rheumatic

dyspeptic will not improve so long as digestion is impaired. Wrongs of the kidneys need to be corrected, and so do those of any other organs. Many times, rheumatism continues owing to nerve impingement affecting the capillary circulation, and a removal of the source of irritation results in a rapid recovery.

One of the happiest cures I ever effected was accomplished by correcting a diseased rectum. The patient had been medicated for months, had spent several weeks at Clifton Springs, N. Y., but had failed to receive benefit; the removal of hemorrhoids and papillæ with a thorough dilating of the rectum, soon effected a cure. Where remedies fail to give benefit, examine the rectum, urethra, and uterus. If there are sources of irritation in these organs, no improvement will follow till they are corrected.

As to local applications, the old irritating plaster accomplished wonders in the hands of the earlier Eclectics. This rather harsh treatment, however, has fallen into disuse and the various stimulating liniments have taken its place, although I still believe that the old plaster accomplished better results.

The patient should wear flannels at all seasons of the year, and avoid damp, low places. The diet should be largely of vegetables, fruits, and farinaceous foods; he should turn vegetarian, though fish and bivalves may be used in season; Londonderry and Buffalo Lithia waters will do some good. Electricity will give relief in some cases, and will be more frequently used when we learn better the conditions calling for its use.

MUSCULAR RHEUMATISM.

Synonym.—Myalgia.

Definition.—A painful affection of the muscles and their attachments, the fasciæ and periosteum. There is most likely some constitutional derangement, and the myalgia is but a local echo of the general condition. The local affection has taken special names according to the seat of the pain; thus torticollis, or wry-neck; lumbago, pain in the lumbar region; pleurodynia, pain in pleura; mastalgia, pain in the breast, etc.

Etiology.—The predisposing causes are various, the most common arising from sudden cooling after severe exertion, or by

exposure to a draft of air, as sitting by an open window, by getting chilled by exposure in inclement weather. A severe strain or twist may be followed by a crick in the back, or lumbago.

The rheumatic or gouty diseases also predispose to the trouble. The primary cause is unknown, and some contend that it is neuralgic in character, affecting the sensory nerves of the muscles, while some contend that it is infectious.

Pathology.—The pathology is not constant. In some cases there is little if any muscular change, while in others there is slight granular degeneration of muscular fibril, or, again atrophy of the muscular tissue. Nodes are sometimes found. There may be inflammation of the sheaths or periosteum, and in some cases thickening and degeneration of the neurilemma of the nerves supplying the part.

Symptoms.—These depend somewhat upon the form or location of pain. It is nearly always local in its effect, there rarely being any fever; usually the pain is intermittent, any motion or sudden jar causing excruciating pain; at times the pain is constant. Deep, firm pressure affords some relief. The attack comes on suddenly, and often as suddenly takes its departure; it may last for a few hours, or persist for several days.

Lumbago.—In this form the muscles of the loins are the ones affected, and it more often occurs among laboring men. The attack is sudden, and the patient imagines that he has strained his back; or he may be in a stooping position, and on attempting to straighten up is seized with a sharp, lancinating pain that may bring him to his knees. When sitting, the patient gets up with great difficulty and much pain; if lying down, he is unable to rise or turn over; in fact, any motion on the part of the patient causes him to cry out with pain.

Torticollis, or Stiff Neck.—In this form the pain is confined to the muscles of the neck, and any motion of the head causes intense pain; as a consequence, when the patient wants to turn his head, he turns the whole body. This form occurs more frequently in the young. Generally the patient's head is inclined to the affected side, thus relaxing the muscles and securing relief.

Pleurodynia.—The pain is in the intercostal muscles, and is often referred to as a stitch in the side; the pain is sharp and lancinating, and intense on full inspiration or on coughing. This is

often called pleurisy, but the difference is readily distinguished when we note the absence of fever and the adventitious sound on auscultation.

Abdominal Rheumatism.—There are a number of other forms though less common, which will be recognized by the location of the pain; thus, cephalodynia, pain in muscles of the scalp; mastodynia, pain in muscles of chest; scapulodynia, pain in scapular region; abdominal rheumatism, pain affecting the abdominal region.

Diagnosis.—This is usually quite readily made. In the various forms considered, the sharp pain, the absence of fever, increased suffering of the part affected, will distinguish the lesion as muscular rheumatism.

Prognosis.—This is favorable, rarely, if ever, a patient dying, unless there be severe heart complication. If seen early, the painful conditions are usually relieved in a few hours, or at most a few days. If neglected, however, it may assume a chronic form.

Treatment.—One of the best agents for this form is macrotys given in quite large doses; of the specific tincture one dram, to water four ounces, a teaspoonful every hour; or if the decoction is used, give in teaspoonful doses every hour. Bryonia will combine nicely in pleurodynia.

In all these cases, dry heat is one of the best local applications. Where the pain is excruciating, a few drops of chloroform on flannel, held against the painful part, gives quick relief. For stiff neck, galvanism will sometimes give great relief. For lumbago, I know of no better treatment than dry cupping; I have seen patients straighten up and walk off comfortably, after removing one or two large cups from the lumbar regions.

In those acute cases where the pain is unbearable, a hypodermic injection of morphia, one-fourth grain, gives speedy relief. This, however, should only be given in extreme cases. After an attack, any wrong of the general health should be corrected, and thus prevent a speedy return of this painful though not dangerous affection.

GONORRHEAL ARTHRITIS.

Synonym.—Gonorrheal Rheumatism.

Definition.—A specific septic arthritis, or synovitis, due to the poison of gonorrheal virus, and resembling rheumatism, though the latter term is a misnomer. While it may occur during the acute stage, it usually follows or accompanies the gleet.

Etiology.—This disease is entirely distinct from rheumatism, therefore to designate it as gonorrheal rheumatism is a misnomer. It is due to the virus or toxins developed from gonorrheal infection, poisoning the articulations, giving rise to a septic synovitis or arthritis.

Pathology.—The evidence of synovitis is not different from that of ordinary inflammation of the joints. In some cases there is but little if any effusion, and the membrane presents a dry appearance, and the inflammation extends along the sheaths of the tendons for quite a distance. There may be effusion into the joints, and in rare cases this may become purulent. In the more chronic form the effusion is quite marked.

One peculiarity of the arthritis is in the virus selecting, for a display of its power, joints not usually involved in rheumatic arthritis, such as the sterno-clavicular, sacro-ileac, intro-vertebral and the temporo-maxillary. There is more apt to be stiffness of the joint following this lesion than in rheumatic arthritis, due to fibrous adhesions and a thickening of the membrane. Endocarditis is not an uncommon complication, which may assume an ulcerative form.

Symptoms.—Usually the joint symptoms develop upon the subsidence of the flow from the urethra. The symptoms vary, usually being of a milder type in the acute than in the chronic. In the acute form, there may be but little swelling of the joint, though the pain is severe and more persistent than in ordinary arthritis. There may be, however, all the symptoms of an acute fibrous inflammation of a joint, with swelling and great pain on motion; the pain is often aggravated at night; the inflammation, extending along the sheaths of the tendon, may pass to the periosteum, giving rise to edema, which persists for weeks or months.

In the chronic form, there is more effusion into the joint,

consequently more swelling, and less tendency on the part of the patient to move the injured member. Pain is the chief feature in both the acute and chronic forms.

Diagnosis.—The history will greatly aid in the diagnosis, and should the patient deny a venereal infection, the persistent pain and absence of a general or systemic trouble, and the unusual selection of joints, will render the diagnosis easy.

Prognosis.—This is favorable, though the course of the disease is slow, and more or less stiffness remains for a long time after recovery.

Treatment.—*Berberis aquifolium* promises some relief, and should be used freely. In the use of local measures fixation will give the best results. Where the pain is very severe, the patient had better undergo anesthesia and the injured member firmly bandaged or even placed in a plaster paris cast. In the chronic form, free incision and thorough irrigation is highly extolled, and no doubt good results attend this procedure.

ARTHRITIS DEFORMANS.

Synonyms.—Rheumatoid Arthritis; Rheumatic Gout.

Definition.—A chronic inflammatory disease of the articulations, characterized by progressive changes in the joint structures, and with periarticular formation of bone, causing marked deformity and greatly impairing their function.

Etiology.—There appears to be a wealth of theory, and a dearth of facts, as to the etiology of this disease. For years it was regarded by many as a phase of rheumatism, or a near relative, while others were equally positive that its similarity to gout was a sufficient proof that they were of one and the same family. More recent observers have declared their belief that the disease is entirely distinct from either; in fact, Heberden, in 1804, declared his belief in a distinct lesion, and insisted that there should be a divorce from gout and rheumatism. He first described the "small nodular outgrowths upon the terminal joints of the fingers," and which are now universally referred to as Heberden's nodes.

Fuller and Garrod, early converts to this belief, called attention to the fact that in arthritis deformans there was not the

blood changes nor visceral manifestations that there were in rheumatism, nor could there be detected a trace of urates in this disease, while in gout it was ever present.

The neurotrophic origin of the disease has many followers, the profession's attention having been directed to this theory by the writings of the Mitchells, father and son, in America; Weichman, in Germany; and Ord and Duckworth, in England.

Hutchinson believes that it is neither a distinct disease from rheumatism, nor a variety, but a blending of the two, or a hybrid. The latest theory is that of infection, and that the cause is microbic. The etiology of the disease is thus seen to be doubtful, to say the least.

Predisposing Causes.—Dr. Garrod's contribution to the "Twentieth-Century Practice" contains a very interesting and instructive article on this disease, and from a tabulated report of five hundred cases the following factors figure as predisposing causes:

Age.—The greatest number of cases occur between the ages of forty and fifty-five, though no age enjoys immunity, three cases occurring before the age of ten, and one between the ages of eighty and ninety; there were less than fifty cases occurring under twenty-five years of age.

Sex.—Of the five hundred cases, four hundred and eleven were women, leaving only eighty-nine cases among the men.

Hereditary Predisposition.—In two hundred and sixteen cases the family history revealed lesions of the articulations. One woman's history revealed the fact that her father and mother had joint affections, and that of six living children, her three brothers and two sisters suffered from enlargement of the joints; thus the entire family of eight were victims of articular deformity.

Rheumatism and Gout.—In one-third of all the cases reported, gout held a prominent place, while rheumatism occurred in but sixty-four cases.

Exposure, dietetic errors, worry, care, and injuries have all been regarded as predisposing causes to the disease, though a reference to his tabulated report would not suggest them as playing an important part.

Pathology.—In the pathological changes that take place we notice, first, that there are no deposits of urate of soda as in gout,

and the extensive structural changes that take place in the joints are not found in rheumatism. There may be effusion in the early stages, but as progressive changes take place, this disappears, and the first effects seem to be felt in the cartilage.

Proliferation of cells takes place, fibrillation follows, which results in softening of the cartilage, especially in the center where the circulation is feeble, and the friction great, from the opposing ends of the bones; this results in the center of the cartilage disappearing, and the exposed ends of the bones, from friction, become polished like ivory, and are termed eburnated. The outer portion of cartilage does not share in the destruction which takes place in the center, owing to absence of pressure, and instead of thinning we find enlargement; finally, ossification takes place, forming the so-called osteophytes, which often cause a locking of the joints.

In addition, nodes may develop from the periosteum along the shaft of the bone. Following these changes, inflammation of the synovial membrane takes place, exudation results, which may become organized, and, in rare cases, ossification takes place. Finally the capsule and ligaments become thickened, resulting in ankylosis. After this, atrophy of the muscles may follow, and, still more rarely, neuritis. The joint turns outward to the ulnar side; the same changes sometimes take place in the toes, they likewise turning outward.

Symptoms.—The dividing line between the acute, subacute, and chronic, or “Heberden’s nodes,” and the “general progressive form,” requires greater skill than most practitioners possess; for the division is more technical than real, all cases being more or less chronic.

Heberden’s Nodes.—In this form the chief characteristics are the nodosities that are formed, osteophytes, at the sides of the distal phalanges, and occur far more frequently in women than in men, usually between the age of thirty and forty. It is more apt to follow rapid child-bearing or undue lactation. The menopause is also a fruitful time for their development. They are apt to be preceded by rheumatism or gout, though not necessarily, for the disease is entirely distinct.

The patient notices that the joints are swollen, slightly reddened and tender on motion, or, if struck, sometimes they are quite painful, though this is exceptional. There may come a period of intermission, and the disease appears to have subsided, but only to reappear, the enlargement gradually increasing, till the knotty excrescences prevent the motion of the joints, and they become locked.

In time the cartilage gives way, and crepitus can be distinguished, which is followed by eburnation. The general health is but little affected in many cases, though some are attended by gastric disturbances and anemia.

General Progressive Form.—This may occur in the acute and chronic form; when acute, it may simulate acute articular rheumatism, the patient having slight fever, with swelling of the joints, the synovial sheaths, and bursæ. There is little redness, however, and usually not a great deal of pain. After a time the disease is stayed, sometimes for years, when some aggravation, such as child-bearing, starts anew the fires that were supposed to be extinct, and the joints take on the usual characteristics.

The Chronic Form is the one usually found. It comes on slowly and insidiously, first in one or two joints, then in the corresponding ones on the opposite member, until the entire articulations are involved; the articulation of the hands being affected more frequently than any other joint, though none are exempt.

The first symptom is a slight swelling of the joint, attended with some stiffness and pain. There may be effusion into the joint, with swelling of the sheaths and bursæ. There is often

but little pain, sometimes none, but in very rare cases the pain is excruciating. As in the other forms, there are times when the disease seems to be stayed, and then is renewed, each time resulting in greater joint changes, till finally the articulation, from osteophytes, thickening of sheaths, and atrophy of muscles, is greatly deformed.

In the hands, the joints are turned outwards or to the ulnar side, and the same may be said when the toes are affected, sometimes the phalanges overlapping. The disease may be confined to the hands, or be followed by the knees, ankles, hips, and vertebrae, continuing till every articulation becomes involved, and the patient, drawn and weak with suffering, becomes perfectly helpless.

Diagnosis.—In the advanced stage there is but little difficulty in making a diagnosis; the great deformity, with but little pain, the turning outward of the fingers and toes, and the immobile condition of the joints, certify to the trouble. In the earlier stages, however, it may be mistaken for chronic rheumatism; but even here the history, with the more gradual invasion, will help to distinguish the one from the other.

Prognosis.—This is unfavorable if the disease is well established, especially where the joints ~~are locked~~ from bony deposits. In the earlier stages it may be arrested, if not completely cured. The disease is rarely ever fatal.

Treatment.—The physician usually sees these cases in the advanced stage, after two or more joints are affected and after ankylosis is partially established; hence the treatment is not satisfactory, but little, if any, benefit resulting from medication; gradually the deformity increases until the patient is a helpless cripple.

If seen early, we may hope to benefit our patients. It is very important to correct any uterine or rectal troubles that may exist, before administering remedies internally. All sources of nerve impingement, whereby capillary circulation is impaired, must be removed, and any systemic wrongs corrected. Berberis aquifolium, stillingia, bryonia, potassium iodide, and the salicylates will be followed by improvement in the earlier stages. Massage is of greater importance, and should be used faithfully and con-

tinuously. Where the patient has means, a course at Hot Springs, Virginia, or Arkansas, will be of benefit.

The diet should be generous, but of such foods as will give increased nourishment. Exercise in the open air should be taken; in fact, hygienic measures will form a very important part of the treatment. Where the patient is unable to visit the famous Springs, some benefit will result from the hot vapor-bath. As a last resort the surgeon may have to be called to our assistance to remove deformities.

GOUT.

Synonym.—Podagra.

Definition.—An abnormal metabolism, attended by an excessive formation of uric acid, and characterized clinically by polyarthritis, affecting mostly the small articulations, and by the gradual deposit of sodium urate in and about the joints, and attended by various systemic disturbances.

Etiology.—Various theories have been advanced as to the cause and nature of gout. Among the predisposing or contributing causes may be mentioned:

1. *Heredity.*—Statistics show that in more than fifty per cent of all cases reported, the disease existed in the parents or grandparents.

2. *Age.*—Gout is mostly found between the ages of thirty and fifty, though, when the hereditary taint is very strong, it may occur before puberty, and in very rare cases it is found in infancy.

3. *Sex.*—Males are more often affected than females, no doubt on account of males being addicted to the drink habit.

4. *Diet and Social Condition.*—Indulging the appetite in rich foods, sweet wines, and malt liquors, with defective muscular exercise, is a prolific source of the disease, and occurs more frequently among the wealthy classes. It is not rare, however, to find gout among the poorer classes, who drink large quantities of malt liquors, and whose food is insufficient in quantity and quality. This is known as "poor man's" gout. The consumption of a large quantity of malt liquors by either rich or poor is a contributing cause.

Chronic lead-poisoning also predisposes to the disease.

These various contributing causes result in a disordered metabolism, in which uric acid is found in excess, but the exact nature of the disease has not yet been proven.

Pathology.—The characteristic anatomical changes consist in the deposit of urate of sodium in and about the joints, the ligaments, and the synovial membrane. In rare cases the deposits are found in the cartilages of the ear, nose, eyelids, and larynx.

The kidneys are the most frequently involved of the internal organs.

In the early stage the acid and sodium salts are in a fluid state, but soon "small, chalky-white dots or lines beneath the surface of the articular cartilage appear, and progressively increase in size, coalesce into larger coherent surfaces, and give rise to destruction and deformity of the articular surfaces." These white, chalky deposits are known as chalk-stones or tophi.

The joint first attacked is usually the great toe, the articulation farthest from the center of circulation; then the ankles, knees, and small joints of the hands and wrists follow in the order mentioned. Not infrequently the skin covering these chalky masses gives way, and the deposits appear externally through the ulcerated opening.

These chalky deposits excite secondary inflammatory changes, which result in fibrous overgrowths, leaving marked deformities of the joints and ankylosis.

In the kidneys the uratic deposits are principally in the papillæ, though to some extent throughout the organ.

Arterio-sclerosis is always present in the blood-vessels of advanced cases, and this in turn gives rise to cardiac hypertrophy, especially of the left ventricle. Uratic deposits have been noted on the valves.

Symptoms.—Gout is generally a chronic disease, coming on insidiously after months of disturbed metabolism, though it frequently begins as an acute articular gout, gradually assuming the chronic form.

Acute Form.—This form is usually preceded by prodromal symptoms for several days. The patient complains of a bad taste, coated tongue, acrid eructations, pain in the head, vomiting and diarrhea; or asthmatic seizures may disturb the patient's rest. Again there are mental disturbances, the patient being restless

and irritable; his sleep is disturbed, followed by great depression of spirits.

Muscular pains and cramps, with fugitive pains in the articulations, are not uncommon. The urine is scanty, high-colored, and there may be albumin present, while traces of sugar may be found—gouty glycosuria. In rare cases the patient feels better than usual the day preceding the attack.

The attack usually begins after midnight, the patient being wakened by intense pain in the metatarso-phalangeal articulation of the great toe. The pain is excruciating, and is described as burning, boring, or crushing in character, as though the toe was in a vise. The toe rapidly becomes swollen, red, and shiny, and the least motion causes exquisite pain. With these local symptoms the temperature rises to 101° , 102° , or 103° . The paroxysm lasts two, three, or four hours, when the temperature falls, the pain subsides, the patient freely perspires, and the suffering is temporarily at an end. The toe remains puffy and swollen, and is somewhat edematous.

During the early hours of the following morning there is a recurrence of the symptoms of the preceding night. Sometimes other joints are involved at the same time, notably the opposite toe and the small joints of the hand or wrist. These attacks occur nightly for from three to eight days, gradually becoming less severe after the second night. The swelling slowly subsides, desquamation of the skin follows, and during the quiet that follows the storm, the health seems improved.

The patient, now truly penitent, observes better habits, and is more careful of his diet, eschews fermented drinks, and for a time there is really an improvement in the general health. After several months, however, the patient grows careless, there is a return to the same conditions that brought about the first attack, and in from a few months to a year or more he again suffers an attack, to be repeated at more frequent intervals, while more joints become affected. One characteristic feature of the tense, swollen joint is that suppuration never takes place.

Retrocedent Gout.—These paroxysms sometimes terminate differently, the pain being transferred to some internal organ, when it is termed *retrocedent gout*. The pain quickly subsides from the affected joint, to appear with great intensity in some internal viscus. When the stomach is the seat of the metastasis,

there is intense pain in the epigastrium, vomiting, diarrhea, and great prostration, sometimes terminating in death.

When the heart is the organ attacked, there is intense pain, dyspnea, irregular pulse, anxious countenance, with great mental distress, the patient fearing early dissolution. Acute pericarditis has followed such metastasis, terminating fatally.

At other times the head receives the force of the attack, and cerebral disturbances are most marked, as shown by delirium, coma, and apoplexy.

Chronic Gout.—As the attacks become more frequent, more joints are affected and the paroxysms last longer, though not of such a severe character. The deposits progressively increase, first in the cartilages, to be followed by deposits in the ligaments and capsular tissues. This is followed by unsightly deformities and loss of articular motion.

Where the chalky deposits are near the surface, as in the knuckles, the skin sometimes gives way, the chalk-stones being exposed. The fingers are deflected to the ulnar side, the one overlapping, as may be seen so often in arthritis deformans.

Although the patient may display great mental and bodily vigor, there is usually more or less disturbance of the stomach and bowels, while the stiffened blood-vessels, hypertrophied heart, and tensive character of the pulse, proclaim arterio-sclérosis.

The urine, plentiful, but of low specific gravity and containing traces of albumin and tube-casts, proclaims degenerative changes in the kidney.

Irregular Gout.—Whenever gout manifests itself in other parts than the articulations, it has been termed irregular gout. The subjects of this form are usually the offspring of gouty parents, though the condition may be acquired. The uratic deposits occur in the various tissues in sufficient quantities to give rise to a multitude of unpleasant symptoms.

Myalgia.—It is not uncommon to find patients of a gouty diathesis to suffer with muscular soreness in the cervical and lumbar regions. A favorite location for the pain is also in the abductors of the leg. These pains are more severe on waking in the morning and disappear as the day progresses.

Nervous Manifestations.—Headache is one of the common heritages of the gouty subject, while neuralgias are often found, especially of the sciatic nerve. The itching, tingling, and burning

sensation so often experienced in the palms of the hand; soles of the feet, and eyeballs, are always suggestive of gout.

Gastro-Intestinal Disorders.—Disturbance of the digestive apparatus is quite common, and is manifested by frequent attacks of vomiting, cramps, diarrhea, and abdominal pain.

Cardio-Vascular Symptoms.—The increased amount of uric acid always makes more or less impression on the vascular system. This may be shown by increased arterial tension, by renal degeneration, or cardiac disturbance. Albuminuria and dropsical effusion would point to lesion of the kidneys, while an irregular pulse, dyspnea, and palpitation would show cardiac disturbance.

Cutaneous Eruptions.—The various forms of eczema are quite often associated with the gouty habit, and are more intractable than when appearing at other times.

Urinary Disorders.—Among the more frequent complications are renal disorders. The urine is excessively acid, and not infrequently contains albumin and tube-casts, while glycosuria is not rare. Renal colic frequently occurs, while disturbances of the bladder and urethra are found, and calculi, both renal and vesical, are common.

Pulmonary Affections.—Chronic bronchitis, asthma, and emphysema are frequent complications of a gouty constitution.

Eye Affections.—Conjunctivitis, iritis, keratitis, hemorrhagic retinitis, and glaucoma, are lesions of the eye, found in gout.

Diagnosis.—When we get a family history of gout in a patient who is addicted to high living, who consumes large quantities of fermented liquors, who leads a sedentary life, and who is attacked after midnight with excruciating pain in the great toe, which rapidly becomes red and swollen, and which, after two to four hours of pain, subsides, to be repeated again the following midnight, the diagnosis is very readily made.

When, however, other joints than the toe are affected, especially before the chalky deposits can be recognized, the diagnosis is not so easily made; even here, however, the family history and habits of the patient will be of assistance in the diagnosis. If we remember that acute rheumatism, the only disease that could be mistaken for gout, attacks the young, is usually attended by active fever, and does not come on so suddenly nor select the early hours of the morning for its invasion, we will not often be mis-

taken in our diagnosis. In old cases, the marked deformity and chalk-stones render the disease unmistakable.

Prognosis.—This depends upon several conditions,—the stage of the disease, the complications existing, and the ability of the physician to change the habits and environments of the patient. When albumin and tube-casts are found in the urine, the prognosis is decidedly unfavorable. While gout does not rapidly prove fatal, the life is shortened by some of the more serious visceral complications.

Treatment.—This may be divided into hygienic, dietetic, and medicinal.

Hygienic.—A temperate and dry climate is desirable, and residence in the country or suburbs preferable. The sleeping-room should be large, well ventilated, free from draughts, and with a sunny exposure. Flannels should be worn with the first chilly weather.

Since oxidation of the nitrogenized tissues can be greatly increased by appropriate exercise, the patient should be instructed to take, though not severe, daily well-regulated exercise. Not only is oxidation increased, but the excretory organs are stimulated and the detritus is eliminated in this way. The daily bath is quite essential, but should be suited to each individual case. Thus a young and vigorous patient would be benefited by a cold bath, with brisk friction, while a feeble or elderly patient would need a warm bath, after which he should remain in bed for several hours. The Turkish bath should only be taken by robust patients.

Dietetic.—Since gout is a lesion of nutrition, we can readily appreciate the value of a restricted diet. We are to remember that much care and attention must be paid to this subject, for the same diet will not do for every gouty patient; and while there are some general rules and restrictions to all patients, we are not to forget that one patient may eat with impunity what would be very harmful to another. As a rule, the amount of food should be lessened, and should be taken at regular intervals. Nearly every one eats more than is necessary after the age of forty.

Red meats in particular should be restricted, and malt liquors and sweet wines absolutely prohibited. A vegetable and fruit diet, with the free use of milk, is to be recommended. Sugar, unless in very small quantities, should also be forbidden. Vegetables of an acid character, and fruits rich in sugar, are to be taken

sparingly, or not at all. While many would restrict fat, Ebstein strongly advocates good fresh butter to the amount of two and a half to three and a half ounces per day. Roberts would have gouty patients use as little salt as possible, since the sodium biurate crystallizes in the tissues with an excess of sodium salts. Most patients, however, may have a mixed diet, if taken in small quantities, slowly and thoroughly masticated, and followed by well-regulated exercise. A diet largely of milk, however, is preferable.

The patient should take freely of pure water, and where the habit is to take but little fluid, he should be instructed to cultivate taking water freely and often. Although customary to recommend some alkaline mineral springs, and though thousands yearly pay visits to some of these famous resorts, as much, if not more, benefit will be derived from a pure water devoid of any alkali.

Medicinal.—During an attack, either the tincture or wine of colchicum should be given in from ten to twenty drop doses every three hours, which will favorably influence the inflammation, and also tend to relieve the pain. When the pain is excruciating, a hypodermic of morphia is permissible. The foot should be elevated and wrapped in cotton-wool.

As a local application, we may use menthol three parts, camphor two parts, well rubbed together; or menthol dissolved in chloroform. After an attack is over, the patient should be placed on the citrate of lithium or potassium, or potassium acetate may be used. Whichever salt is used, the patient must be instructed to drink large quantities of water. Piperazin is highly recommended, and should be given in five-grain doses four times a day. The salicylates, especially salicylate of sodium, have been highly extolled in the chronic form. Following an attack, the patient should be placed on a milk diet, to which may soon be added eggs, fish, and fruits, bananas excepted. As soon as able, the hygienic measures already mentioned, should be carried out.

RICKETS.

Synonyms.—Rachitis; Rachitismus.

Definition.—A disease of early infancy and childhood, characterized by an excessive development of the bony tissues, which

are deficient in the lime salts, leaving the osseous tissues soft, which leads to deformities.

Etiology.—The specific cause of rickets is unknown, though we are familiar with many conditions that may be classed as predisposing factors in the disease.

It is found much more frequently in the poorer quarters of all large cities in the north temperate zone, where all the conditions are favorable for impairing vitality, while it is seldom found in the cities of the tropics, no doubt exposure to outdoor air and sunlight neutralizing the effects of poverty.

Unfavorable environments, found in the poor classes of all large cities of the North, must certainly contribute much towards this condition. Housed in damp, dark, poorly ventilated quarters, where pure air and sunshine are unknown quantities, the vitality is impaired, and when we add to these conditions that of poor food, we have a combination that gives rise to mal-nutrition. These same conditions impair the vitality of the mother, rendering her milk of poor quality, or, if the baby be hand-fed, sweetened condensed milk, or starchy artificial foods mixed with water, set up fermentative processes, whereby lactic acid is generated, the alkalinity of the intestines is diminished, and the assimilation of lime salts prevented.

Race seems to predispose to rickets, the colored and Italian children, especially in the crowded quarters of all large cities, showing a larger per cent of rickets than those of other races.

Tuberculosis and syphilis always impair the vitality of the offspring, and thus favor mal-nutrition; hence it is not uncommon to find rickets in children from tuberculous and syphilitic parents.

Pathology.—The constant and peculiarly characteristic pathological changes are found in the bones, the visceral changes being secondary and generally unimportant.

The long bones and those of the skull are most frequently affected, and give rise to the most common deformities. Thus the bending of the tibia and femur, owing to the weight of the body, is quite common, while the large, square head is characteristic of rickety subjects. Chest deformities also occur, and we have the chicken-breast or pigeon-breast.

The funnel-shaped pelvis is due to enlargement and thicken-

ing of the pelvic bones. Distortions of the spinal column also occur, and thickening of the ends of the ribs near the costal cartilages give rise to a beaded appearance known as the "rachitic rosary."

A rachitic bone, if examined in a fresh condition, is much softer than one in a normal state, and the actively developing centers, as the epiphyses of the long bones and the centers of ossification in the cranial bones, are found to be larger and very vascular. The periosteum is thickened and adheres tenaciously to the surface, and when separated from the bones, irregular masses of pulpy osseous tissue are adhered to the inner surfaces. A portion of bone thus denuded reveals a soft, vascular, spongy tissue.

From fifty to sixty per cent of the calcium salts are removed; hence the bones are lighter and more fragile, and green-stick fractures are common in rickety children.

The cranial bones may have so little of the lime salts present as to leave them soft and parchment-like and when palpated they give a crepitant sound, known as "craniotabes."

After the acute stage has passed, the bone may remain soft and spongy, the interstices containing fatty matter, or a rapid bony formation may take place, leaving the bone hard like ivory.

Enlargement of the liver and spleen may occur, due to fibroid degeneration, while catarrhal inflammation of the gastro-intestinal tract is quite common. Anemia is found in all cases.

Symptoms.—For some time before any visible osseous changes or deformities take place, certain prodromal symptoms appear that may be said to be characteristic. These are gastro-intestinal disturbances, irregular fever, night-sweats, diarrhea, debility, and general evidences of mal-nutrition. The child is peevish, restless at night, and frequently vomits a sour mass of undigested food. Diarrhea, the stools being excessively acid, may alternate with constipation; profuse perspiration, also acid in character, bathes the head at night, the pillow becoming quite damp and ill-smelling.

The child early shows tenderness about the joints, the soreness becoming general, the child crying when handled. The muscles become weak, flabby, and unable to perform their function; hence what at one time was supposed to be rachitic paralysis, is now known as muscular debility.

The little patient becomes feeble and puny, with prominent abdomen.

Dentition is delayed, and this, together with the symptoms already mentioned, would suggest rickets.

The first evidence of deformities may be seen in the bending of the ribs, with beads or nodules at the junction of the ribs and costal cartilages, or the wrists, ankles, and condyles of the femur may be the first to show evidence of deformity, not infrequently the large fontanels and square-shaped head will be first to attract attention.

The sternum is often thickened and crowded forward, and, the sides of the thorax being compressed, the chest assumes the appearance of a bird's thorax, and is known as pigeon-breasted. As a result of this deformity, the lungs are compressed, are unequal in size and development, and lesions of the respiratory apparatus are quite common. The heart may be crowded to the right and forward, the pulsation being quite visible.

Not infrequently there is a tendency to spasmodic contraction of the muscles of the larynx, giving rise to spasmodic croup, laryngismus stridulus, and severe forms of whooping-cough.

Pelvic deformities, due to pressure upon the bones, and curvature of the spine, are peculiarly unfortunate in the female, as it renders labor in after life either extremely difficult or impossible.

The lower extremities suffer more frequently than other portions of the body, and club-feet, bow-legs, and knock-knees are not uncommon in rickety children.

The frequency of fractures in the fragile bones, and the tendency to imperfect union of the same, or the partial fracture, green-stick fracture, adds to the deformity.

Diagnosis.—This is readily made after the various deformities appear, and certain characteristic symptoms should excite suspicion very early; these are gastro-intestinal lesions, when the child frequently vomits a sour and ill-smelling, undigested meal; has sour diarrheal stools; profuse sweating about the head; tenderness and soreness on being handled; is cross, restless, and peevish, with a disposition to remain passive, and delayed dentition,—these should suggest rickets.

Prognosis.—Where favorable hygienic surroundings can be secured early, and the child can live mostly out of doors, in a climate where there is a maximum of sunshine, and where a nu-

trititious diet can be appropriated and the right remedies selected, a favorable cure may be established, and even deformities be corrected or made to disappear entirely.

Where the deformities are marked, they will of course remain. If the chest be pigeon-shaped, there will be danger from respiratory troubles, and when the pelvis is involved in the female, parturition will be attended with danger.

Treatment.—In the treatment of rickets, as much, if not more, depends upon the hygienic care given than upon medication. The child should not lie upon a feather bed, nor one too hard, a hair mattress being preferred.

If the mother's milk be of a poor quality, the child should be furnished with a wet-nurse, whose milk is of unquestioned quality. Where this is not possible, good cow's milk is preferable to artificial food. The milk should be diluted with barley-water, slightly sweetened with sugar of milk, and only such quantity given as can readily be digested. Later, as much fats and proteids should be furnished as can be appropriated, but a very small amount of carbohydrates are to be allowed.

The child should be sponged daily with salt water, and gently massaged several times each day, to establish a better circulation and relieve painful parts. Olive-oil may be used with benefit in the rubbing. The little patient should be much in the open air and sunshine, even in cold weather, if the air be dry.

Iron, arsenic, and the hypophosphites, in doses suitable to the age of the patient, should be given, and if the stomach will tolerate it, cod-liver oil may be given with advantage.

Such agents as taraxacum, iris, euonymus, phytolacca, stil-lingia, corydalis, rumex, berberis aquifolium, and such other remedies as influence the blood, will be found useful.

Silica and calcaria carbonica may be given with much benefit. Rickets is a good disease to test the efficacy of the Schussler tissue remedies should the patient fail to improve on the well-known remedies already named.

SCURVY.

Synonym.—Scorbutus.

Definition.—A systemic affection due to lack of variety in the dietary, especially in an absence of vegetables, and charac-

terized by anemia, hemorrhages into the skin, subjacent tissues, and sometimes into the articulations, spongy gums, and marked prostration.

Etiology.—It is still an unsettled question as to the specific cause of scorbutus. Nearly, if not quite, all writers agree that a prolonged diet on salted meat with an insufficient amount of vegetables, is the chief cause, and attribute the changed condition of the blood, from alkaline to acid, to an absence of the potassium salts, in which fruits and vegetables are rich.

Albertoni has shown, in some studies on the chemistry of the blood and of digestion, "that there is a serious deviation from normal in the free HCl of the gastric juice, that intestinal putrefaction is excessive and that the urine furnishes abundant evidence of the absorption of toxins, while the absorption of fats and carbohydrates is deficient." (Banks, in "Reference Handbook of the Medical Science.")

Unhygienic surroundings, overwork, and old age, predispose to the disease, while anemia, chronic intestinal diseases, chronic malaria, and syphilis, also favor it. It rarely appears as an epidemic in modern times, though formerly epidemics were not rare. The improved sanitary measures of army and ship life and a greater variety in the dietary of each, make scurvy a rare disease in this, the beginning of the twentieth century.

Pathology.—The most constant lesions are the soft, spongy, ulcerated condition of the gums and hemorrhages into the various tissues. The teeth become loosened and frequently drop out, while hemorrhage occurs beneath the skin, giving rise to ecchymotic spots. Submucous hemorrhages are common, and subperiosteal hemorrhage constant, with occasional bleeding into the articulations, muscles, serous membranes, and internal organs.

There may be fatty or granular degeneration of the liver, kidneys, and spleen. If we except anemia, the blood shows no characteristic changes. Ulcers are sometimes found in the ileum and colon.

Symptoms.—The onset is rarely acute, but comes on very insidiously. There is usually a history of gradual prostration, loss of appetite, full, thick, moist, dirty tongue, foul breath, and a dry skin of a dirty, muddy, color; the face is slightly puffed or swollen, and the gums are soft, spongy, dusky in color, and bleed

easily. Not infrequently the gums ulcerate, the teeth are loosened, and occasionally drop out.

With the change in the gums, hemorrhages take place in the various tissues. In the subcutaneous tissues, the most dependent parts suffer first, and ecchymotic or purpuric spots are first seen about the ankles, then upon the trunk, and finally upon the face. Although these develop spontaneously, they are hastened by blows or external injuries.

Where the hemorrhage is quite extensive and embraces the muscular fibrous, and subperiosteal tissues, the part becomes indurated and painful. The articulations are frequently swollen and painful, the result of hemorrhages. The hemorrhage may occur from mucous surfaces, and epistaxis, hemoptysis, hematemesis, hematuria, and enterorrhagia are seen in rare cases.

As the disease progresses, emaciation increases, there is great mental depression, palpitation of the heart, and dyspnea on slight exertion. In the early stage the temperature is normal, but as the blood becomes impaired and anemia develops, a subnormal temperature is frequently found. The pulse, from the increasing debility, is feeble and rapid and the respiration hurried, especially on slight exertion.

The urine is scanty, high colored, of high specific gravity and generally albuminous. Diarrhea, dysenteric in character, with bloody mucous stools, is often present.

Diagnosis.—The diagnosis is readily made when we have the history of improper food for a long-continued period. In such cases there are a number of individuals involved, and the attention of the physician is readily turned to scurvy. The presence of soft, spongy gums, readily bleeding when pressed, the occurrence of hemorrhage in the various tissues, and the great prostration, make the diagnosis positive.

In sporadic cases, and to the inexperienced, the disease may be mistaken for anemia or some of the arthritic forms of purpura, but the spongy gums and the previous history will enable one to differentiate the one from the other.

It may be recognized from purpura hemorrhagica, the only other disease that might be mistaken for it, by the absence of the gingival symptoms, the brighter color of the macules, the cleaner color of the skin of the latter, and the greater swelling of the articulations.

Prognosis.—The prognosis is generally favorable, though much depends upon the progress of the disease, the complications, and the previous condition of the patient. When fresh vegetables and fruit-juices can be freely furnished, and there is no serious internal hemorrhages or enfeebled heart, and when syphilis is not a marked feature, recovery is the rule.

Treatment.—Scurvy being a preventable disease, a very important part of the treatment will be prophylactic, and consists in supplying vegetables, acid fruits, and fresh meat. Fortunately hygienic and dietary measures are being considered more than ever before, and the cuisine of all eleemosynary institutions are far more liberal than in former times.

The treatment is largely dietetic, and consists of furnishing the patient with green vegetables and fruit-juices. Lemon-juice diluted with water may be taken freely every one or two hours. Grape-fruit, oranges, pie-plant, and acid fruits and vegetables in general may be used. If there is great debility, the patient should be kept quiet in bed till the bodily strength is at least partially restored.

Broths, milk, eggs, cereals with cream, in fact, a rich and nutritious but fluid or semi-fluid diet, should be given.

Nux vomica, hydrastis, strychnia, berberis aquifolium, and like remedies, may be used with much benefit. Locally, as a mouth-wash, potassium chlorate and hydrastin will prove very efficient. To add tone to the spongy and softened gums, tincture of myrrh and glycerin will answer a good purpose.

INFANTILE SCURVY.

Synonym.—Barlow's Disease.

Etiology.—The disease occurs between the ages of nine and fourteen months, and is due to an absence of mother's milk, the child being bottle-fed on some one of the many artificial foods, and which lacks some important essential to nutrition. Even cow's milk, though sterilized, is said to give rise to it. It occurs more frequently among the children of the rich and well-to-do, since the custom among the latter class, of bottle feeding, is becoming greater each year. Barlow says, "The child that is suckled at the breast *never* develops scurvy."

Rickets predisposes to scurvy, and many writers believe that infantile scurvy is but a hemorrhagic fever of rachitis.

Pathology.—The osseous changes are similar to those of rickets. Intraperiosteal hemorrhages are responsible for the separation of the epiphysis from the shaft of the bone. These changes take place most frequently in the ribs and femurs, though the bones of the upper extremities and the vertebræ may also be the seat of hemorrhages. The marrow of the bones becomes gelatinous. The spleen, especially when rickets is present, is enlarged. The gums become spongy as in the adult, and subcutaneous hemorrhages may extend into the muscular tissue.

Symptoms.—As the child grows feeble it becomes cross, peevish, and restless, sleeps poorly at night, and worries during the day. The skin shows the muddy color that is seen in the adult, the face is puffy and bloated, and ecchymotic spots appear about the eyes. There is tenderness of the joints, and the child cries when handled. The limbs may be flexed in the early stages, and there is swelling in the course of the shaft or about the ankle or knee joints. As the disease progresses, the limbs are straightened and slightly everted, due to a separation of the epiphysis from the shaft. Where the child has teeth, the gums are swollen, soft, and spongy, as in the adult, and bleed very easily; but if there be no teeth, the gums may appear normal or show a bluish swollen front. Hemorrhages from the mucous surfaces may occur, and extravasation in the subcutaneous tissues is not uncommon. There may be present an irregular fever as in the adult, though generally the temperature is normal. Rickets is frequently associated with the disease. Diarrhea is generally present.

Diagnosis.—This is not usually difficult. The pains in the extremities, the swelling of the shafts of the bones and about the joints, the paralytic condition of the lower limbs, the ecchymoses in the skin, and the history of the infant being bottle-fed, leaves no room for a mistake in the diagnosis.

Prognosis.—If recognized early, the disease in infants and children is seldom fatal. In three hundred and seventy-nine cases collected by the American Pediatric Society, the mortality was eight per cent.

Treatment.—The substitution of a wet-nurse for the bottle,

with the addition of beef-juice and a little orange-juice and lemonade during the day, will soon work a wondrous change. Where a wet-nurse can not be secured, cow's milk, properly modified with the fruit-juices above mentioned, will give good results. The hygienic conditions should be of the best, and the child kept much in the open air and sunshine.

PURPURA.

Synonyms.—Hemorrhæa Petechialis; Hemorrhagic Diathesis.

Definition.—A condition characterized by extravasation of blood into the skin and mucous membrane, and sometimes attended by free hemorrhage from mucous surfaces. It may accompany a variety of causes, appearing in many diseases.

The purpuric spots vary greatly as to size. Where small, like a pinpoint, they are termed petechia, while the larger spots are called ecchymoses. Although at first the spots are bright red, they grow dark or dingy with age.

Varieties.—The disease is divided into symptomatic or secondary purpura, and idiopathic purpura.

Symptomatic Purpura.—This may be due to certain diseases, and may be classed as follows:

Infectious, such as small-pox, measles, typhoid fever, septicæmia, pyæmia, scarlet fever, cerebral-spinal meningitis, ulceration, endocarditis, and diphtheria.

Cachectic, where it follows malignant growths, tuberculosis, Bright's disease, and the debility of old age, ecchymotic spots frequently being seen on the back of the hands of elderly people.

Toxic.—Purpura not infrequently follows the ingestion of certain drugs, as the iodids, quinine, copaiba, belladonna, rhus tox., mercury, ergot, phosphorus, chloral, potassium chlorate, and the salicylates. It may occur from the bite of venomous snakes.

Neurotic.—Lesions of the spinal cord are not infrequently attended by purpura; thus acute and transverse myelitis, locomotor ataxia, and hysteria may be cited as examples.

Mechanical.—Purpura may attend the severe paroxysms of cough in pertussis or asthma, or it may follow severe convulsions.

Idiopathic Purpura.—*Purpura Simplex.*—This is the mildest form of purpura, and most frequently met with in children. The cause has not been determined. The hemorrhages usually occur on the extremities, and more rarely on the trunk and arms. They appear in the form of petechial spots in the hair-follicles, or in long streaks, vibices, or as large ecchymotic spots. There is generally impairment of the appetite and more or less gastro-intestinal disturbance.

Purpura Rheumatica.—Arthritic Purpura; Peliosis Rheumatica; Schönlin's disease. The etiology of this form is unknown, though many regard it as rheumatism occurring between the second and third decade. It occurs more frequently in males than females. It not infrequently is preceded by sore throat, attended by painful swelling of the joints, especially of the lower extremities; accompanying these symptoms, purpuric spots, frequently associated with urticarial wheals and more or less edema, develop.

There is a loss of appetite and slight fever. Epistaxis may occur, though hemorrhages from mucous surfaces are exceptional. The disease seldom proves fatal.

Henoch's Purpura.—This is a form of arthritic purpura occurring in children, and characterized by painful swollen joints, purpura eruptions, hemorrhages from the mucous surfaces, and gastro-intestinal disturbances. The disease rarely terminates fatally.

Purpura Hemorrhagica.—*Morbus Maculosis Werlhofii.*—This form of purpura is most frequently found among young females whose health is impaired, and is the most severe type of the purpuras. The cause has not been determined, though, from its frequent association with infectious diseases, it is regarded as due to an infection.

Symptoms.—The invasion is generally abrupt, though it may be preceded for a day or two by prodromal symptoms, such as headache, general malaise, loss of appetite, and depression. Beginning with slight fever, purpuric spots quickly appear, the extravasation often occurring quite extensively. At the same time hemorrhages may occur in the internal organs, and bleeding from the nose, stomach, kidney, and lungs, soon gives rise to great prostration and profound anemia.

Diagnosis.—The diagnosis is made by the sudden onset, the

rapid appearance of the purpuric spots, the severe hemorrhage from the mucous membranes, and the profound anemia.

Prognosis.—This is the most severe form of purpura, and is always more or less grave; the prognosis should be guarded. Death may occur from the great loss of blood or from hemorrhage into the brain.

Treatment.—In selecting treatment for purpura, each case demands a special study and when possible, the cause should be determined and remedies used for its removal. In all cases the system is below par, there being more or less impoverishment of the blood. A study of such remedies as *berberis aquifolium*, *stillingia*, *rumex*, *corydalis*, *chimaphila*, and *kalmia* will prove profitable.

HEMOPHILIA.

Synonyms.—Bleeder's Disease; Hemorrhagic Diathesis.

Definition.—A hereditary disease characterized by frequent and sometimes uncontrollable hemorrhage, either external or interstitial, and occurring either spontaneously or from slight traumatism.

Etiology.—This constitutional defect is in some unaccountable manner transmitted from mother to son, and while the daughters of such a mother are not bleeders, they in turn transmit the same constitutional defect to their male offspring, though the children of a bleeder escape the disease. The disease is confined almost entirely to the male sex, the proportion being thirteen to one. It is found in all classes, and, strange to say, its victims are frequently large, vigorous, and well developed. It usually appears before the second or third year, though it may be delayed to the tenth year or even later.

Pathology.—The pathology of hemophilia is not well understood. In some cases the walls of the capillaries are unduly thin. Enlargement of the joints, especially of the knees, is common. Coagulation of the blood is delayed, and this peculiar condition may be due to a perversion of some of its essential constituents. Hemorrhages may occur in and about the capsules of the joints, and inflammation of the synovial surfaces may occur. In one of my cases this was a marked feature.

Symptoms.—The general health is generally remarkably good, with the exception of an occasional attack of synovitis or rheumatism. The essential symptoms, then, are frequent prolonged hemorrhages, either spontaneously or traumatic.

Spontaneous hemorrhages are more apt to occur during the early years of life, and after maturity this tendency may subside and bleedings only occur as the result of a traumatism; thus one of my patients had frequent and alarming hemorrhages, occurring from the gums and nose, up to the age of twenty-five years, since which time (he is now forty-eight) the only severe hemorrhages have been the result of injuries.

The slightest bruise will be attended by severe interstitial hemorrhage; in one instance, the result of a fall, the leg, from the knee to the ankle, became a dark-purple plum-color. In some cases the bleedings only occur as the result of an injury; thus the brother of the case just referred to has had several prolonged and dangerous hemorrhages, the result in one case from the extraction of a tooth, the patient bleeding at short intervals for nearly two weeks, and another severe bleeding from a slight injury to the lip. The two brothers, the only children of the family, have never suffered from anemia, notwithstanding the great loss of blood, owing, I think, to their splendid appetites and digestion.

The bleeding may occur from the nose, mouth, kidney, or urethra, and not infrequently into the joints. The bleeding consists of an oozing from the capillaries, and may last for days. Frequent attacks of rheumatism are the most common affection to disturb the otherwise healthy state of a bleeder.

Diagnosis.—Knowing the history of a hereditary disposition, a persistent capillary oozing would render the diagnosis very easy. Without such a history, our diagnosis would be made by a prolonged and almost uncontrollable hemorrhage, without sufficient cause to account for it.

Prognosis.—A large per cent of bleeders die young, perhaps fifty per cent before the tenth year, and every year lived after that age favors a gradual change for the better and a final disappearance of the tendency to hemorrhage.

Treatment.—Perfect quiet must be enjoined and all excitement overcome. Internally the first trituration of *carbo veg.*

has served me well in one persistent bleeder. Oil of cinnamon and erigeron in five to ten drop doses will also be found to give good results, while gallic acid in from five to ten grain doses may be tried.

Locally, firm compression may prove successful, and tannin, perchloride of iron, chloraseptic, and adrenalin may be tried in turn, though I prefer the dry tampons of wool or asbestos, since the ferruginous applications are apt to cause such a hard clot that in its removal a fresh hemorrhage is excited. Circumcision should not be performed on a bleeder, nor any other surgical operation, unless absolutely necessary; the extraction of a tooth being attended with danger.

PART VII.

DISEASES OF THE BLOOD AND THE DUCTLESS GLANDS.

ANEMIA.

Definition.—By the term anemia is understood a change in the quantity or quality of the blood, and represents a variety of affections, deterioration of the blood being characteristic of each.

There may be a reduction in the volume of blood, without alteration of its composition, when the term *oligemia* is applied, or a reduction in the number of red corpuscles, is termed oligocythemia, and when the amount of hemoglobin is deficient oligochromemia is the term applied.

The simplest and perhaps best classification of anemia is into primary, or idiopathic, and secondary or symptomatic.

By primary, idiopathic, or essential anemia, is understood a disturbance of the blood or blood-making organs, or both, the anemia being the distinctive feature of the lesion, and all the other symptoms are secondary or dependent upon these.

By secondary anemia is understood a disturbance of the blood, due to some disease acting upon the blood or blood-making organs, the anemia being secondary.

Primary anemia is divided into two distinct forms: Chlorosis and progressive pernicious anemia.

CHLOROSIS.

Synonym.—Green Sickness; Chloremia.

Definition.—A form of primary anemia affecting mostly girls at the period of puberty or early womanhood, and characterized by a marked deficiency of hemoglobin in the red corpuscles.

Etiology.—The disease is confined almost entirely to females. Noorden, Eichorst, Jurgensen, Hayem, Luzet, and Liebermeister hold that chlorosis never occurs in the male; but of one hundred and eighty cases of chlorosis reported in the Leipsic Medical Clinic, eight occurred in males, though some doubt exists as to the correctness of the diagnosis.

The disease nearly always appears during the second decade, or between the fourteenth and twentieth year.

Unhygienic surroundings undoubtedly figure as a causal factor, for it is quite common in those closely housed, and where the air is bad, and where there is little sunshine. Factory girls, clerks, sewing girls, and those confined in badly lighted and poorly ventilated quarters, where the work is exacting and the hours long, and who eat hastily, improperly prepared food, are prone to chlorosis. While these conditions favor this lesion, it must also be recognized that girls reared in luxury are numbered among its victims.

Heredity is supposed to have some influence in predisposing to the disease, chlorotic children not infrequently having the history of anemia running back two generations.

There seems to be a close relationship between tuberculosis and chlorosis, since girls who have a strumous tendency are prone to become chlorotic. Some have claimed that it is due to mental emotion, and cite cases where chlorosis developed after sudden shock or violent emotion, homesickness, and disappointment in love.

Sir Andrew Clark considered it due to the absorption of toxic products from constipation.

A change of climate has been considered a cause, and girls who have emigrated to this country and become chlorotic have been cited as examples. It is more probable, however, that a change in the manner of living has been more responsible for chlorosis than climate.

We may infer that any condition that lowers the vitality and impairs the blood-making function is a factor in producing chlorosis.

Pathology.—The pathological conditions are not very well understood, few cases dying of the disease, and where autopsies have been held the conditions were not constant.

According to Rokitsansky, incurable cases of chlorosis are

characterized by a defective formation of the blood-vessels and genitalia. Virchow also found a congenital hypoplasia of the vascular system in several autopsies on chlorotic patients. In some cases the uterus and appendages were imperfectly developed. Fatty degeneration of the intima of the arteries is sometimes noticed, and the heart has been softened, dilated, and the left ventricle hypertrophied.

There is a marked reduction in the hemoglobin, and though the red corpuscles are changed in size, there is but a slight reduction in numbers. The specific gravity of the blood is reduced.

Symptoms.—The disease usually comes on gradually, the patient losing color and taking on a greenish-yellow hue; hence the term "green sickness," characteristic of chlorosis. Sometimes the color of the cheeks and lips are retained, when the term chlorosis rubra is applied. The subcutaneous fat is retained, and in some cases increased. There is languor, weakness, with dyspnea, and palpitation of the heart on exertion. The patient complains much of headache and dizziness.

There is usually gastric derangement. The appetite is very poor or perverted, there being a craving for charcoal, chalk, slate-pencils, or even earth, pickles, and highly spiced articles of food. Following a meal, there are acid eructations, regurgitation of food or vomiting, the patient complaining of more or less pain. The tongue is usually pale, with a dirty coating, showing indentation of the teeth, or it is dry and brown.

Constipation is nearly always found, though a diarrhea frequently intervenes, owing to ingestion of some unwholesome food.

The pulse is small, frequent, and easily compressed, while the skin and extremities are cold. In some cases pulsation is visible in the carotids and superficial veins.

Examination of the heart reveals a soft systolic murmur, heard the most pronounced over the pulmonary area. Sometimes a systolic murmur is heard over the subclavian artery. A continuous murmur is often heard over the veins of the neck, and is called the venous hum or "bruit de diable."

In some cases there is an absence of horizontal folds in the forehead when the patient is suddenly asked to look up without raising the head. This is known as the "Joffroy's sign." Edema of the ankles appears, and is often noticed where the disease is

long standing. The urine is pale and of low specific gravity. The conjunctivæ become pale, while the sclerotic coat assumes a pearly or bluish-white color, and is considered by some as pathognomonic of chlorosis.

Neuralgic pains of the head, ringing in the ears, mental depression, and gastralgia and hysterical attacks are often present. Menstruation is generally arrested or scanty, though menorrhagia sometimes exists.

Diagnosis.—This is usually readily made. When a young girl appears with a yellowish-green hue, dyspeptic symptoms, capricious appetite, dyspnea and palpitation on slight exertion, bluish sclerotic coat, scanty menstruation, or amenorrhea, constipation, and with a well-nourished appearance, headache with dizziness, and more or less hysteria, we have a group of symptoms that can not be mistaken.

Prognosis.—This will be favorable in all cases except those where there is congenital anomalies of the vascular and genital system.

Treatment.—Dr. Scudder used to say: "In the treatment of chlorosis we have three prominent indications to fulfill: First, to remove any disease which may exist independently of the chlorotic condition, and which may, by its continuance, tend to keep it up. Second, to restore the blood to its normal condition, by the use of tonics and iron, nutritious diet, appropriate exercise, the use of baths, etc. Third, to stimulate the uterine organs to a performance of their natural functions." I am satisfied if we can correct the first two conditions the third will right itself.

To restore the blood to its normal condition requires, first, good food, capable of making good blood; and, secondly, a good digestive apparatus to prepare it for its final elaboration into healthy red corpuscles. Taking for granted that the patient has a good food-supply, our first object will be to restore the digestive organs. Wrongs of the stomach, and constipation of the bowels, will receive first attention. It is folly for us to expect to make good blood by the administration of iron, when our patient has a bad stomach, as shown by the coated tongue, bad breath, more or less nausea, and with the bowels constipated.

First clear the tongue, restore the appetite and overcome the constipation. Where the tongue is heavily coated, the quickest

way to get relief is the old lobelia emetic, with copious draughts of warm water. By its action the stomach is thoroughly emptied of a viscid and offensive mucus and put into condition for the digestion of food and the absorption of medicines. It is, however, unpleasant treatment, and has largely gone out of use. The more modern method is, to wash out the stomach three or four times a week with the lavage tube. If the tongue has a dirty, pasty coating, sodium sulphite will accomplish the same results. Where the tongue is moist and yellow, with offensive breath, nothing quite equals potassium chlorate and phosphate of hydrastin. If the tongue be slick and dirty, sulphurous acid will correct the wrong. As soon as the tongue cleans, and the appetite improves, nux and hydrastin can be given with benefit, or drop doses of Howe's acid solution of iron. Cuprum is a good remedy where the skin is of a greenish-yellow color, and the tongue clean. Of the tincture add ten to twenty drops to half a glass of water, and give a teaspoonful every three hours.

For the constipation the small podophyllin and hydrastin pill, with daily massage of the bowels, will prove curative. If very obstinate, an occasional fifteen or twenty grain dose of sodium phosphate will act as a persuader. As a tonic, the old compound tonic mixture (triple phosphate of quinine, strychnia, and iron) is one of the best.

As the patient improves, pulsatilla, viburnum, macrotys, and such remedies as act upon the reproductive organs may be used, though in most cases, as the general health improves, the menstrual function takes care of itself. The patient should live as much out of doors as possible, though exercise should never be carried to the extent of weariness. The diet should consist of broiled steak, lamb-chops, roast-beef, fresh eggs, farinaceous vegetables and ripe fruit.

PROGRESSIVE PERNICIOUS ANEMIA.

Synonyms.—Idiopathic Anemia; Essential Anemia; Corpuscular Anemia.

Definition.—A grave blood-disease, characterized by a progressive decrease in the number of red corpuscles and by fatty degeneration of the various viscera, and a characteristic, lemon-yellowish decoloration of the skin.

Etiology.—Pernicious anemia depends upon an insufficient and defective formation of red corpuscles, and is found more frequently in middle life than in the young, and among the poor classes rather than the well-to-do, though it may be found in children and persons of wealth.

It is not a common disease, though in Switzerland it prevails more frequently than in any other country. Addison was the first to clearly describe pernicious anemia as an idiopathic disease, and though there have been many who have doubted that it could exist as a distinct lesion, we will have to admit that there are cases of anemia, when there is no appreciable cause,—cases that have not been preceded by tuberculosis, Bright's disease, malignant growths, renal, hepatic, or splenic affections, wasting diseases, hemorrhages, or chronic diarrheas.

Pregnancy and parturition may be associated with anemia. The course of pregnancy may be attended with so much nausea and vomiting that the function of blood-making is seriously impaired, and anemia of a permanent character develops. Generally, however, the anemia develops *post partum*. Atrophy of the stomach has been regarded as a cause of anemia, the two being often associated, though Grawitz regards the atrophy the result, rather than the cause.

In rare cases, parasites may be the producing cause, by impairing nutrition and establishing toxins that result in cell destruction; the *anchylostoma duodenalis* and the *bothriocephalus* being the ones most frequently responsible for the disease.

Exhausting diseases and profuse hemorrhages may also figure as contributing causes, but after we exclude these we still find cases of pernicious anemia that can not as yet be accounted for. Quincke and Peters think that the increased hemolysis is due to the large amount of iron found in the liver at this time. Hunter called attention to the urine of anemic patients. He found it darker in color and containing pathological urobilin. His findings naturally strengthen the views of the last-named writers.

Pathology.—The skin presents a characteristic lemon-tint. There is but little emaciation. The fats are well preserved and of a yellow tinge, while the muscles may be pale or of a reddish color, resembling horse-flesh. The heart is flabby, and contains but little blood. There is fatty degeneration of the organ, the muscular fibril being replaced by fat. The spleen is but slightly

enlarged, and shows a cloudy swelling or fatty degeneration. The liver and kidneys present the same characteristic changes, and in addition, there is an excess of iron. In the liver it is deposited in the outer and middle zones of the lobules while in the kidneys it is found in the convoluted tubules. Hemorrhages occur in the retina, skin, and other portions of the body. There is nearly always a change in the bone-marrow, it becoming reddish, and soft in character. The stomach is usually diminished in size, with atrophy of the gastric tubules. The intestinal glandula share in the atrophy. Punctate hemorrhages occur in the brain, and the spinal cord, and posterior sclerosis of the cord is not infrequent.

Fatty degeneration of the various viscera, and even the intima of the smaller vessels, is perhaps the most constant lesion, if we except the blood changes.

The blood shows a marked diminution of the red corpuscles as well as other changes in these cells. It is pale, thinner, and does not coagulate readily. The red blood-corpuscles are often reduced to 1,000,000 per cubic millimeter, and in extreme cases to 500,000, while 143,000 has been recorded. The blood-disks are found widely separated, and not forming rouleaux.

These blood-cells are of various sizes and shapes, the giant cells predominating, though there is a wide range between the megalocytes and the microcytes. In form they may be spherical, oblong, dumb-bell shaped, or of other irregular shapes. There is also a reduction of hemoglobin. The leukocytes are diminished in number, but do not assume the peculiar shapes noticed in the red blood-corpuscles.

Symptoms.—The disease comes on so insidiously that the patient is unable to refer to the day that the disease arrested his attention. He, perhaps, has noticed for some time that his strength was failing, and that he was getting pale; that his appetite was poor, and that he tired readily on exertion. Among the earlier symptoms are shortness of breath, slight palpitation of the heart, dizziness, ringing in the ears, and headache. Dyspeptic symptoms are common, and nausea and vomiting, with diarrhea, are often present. The patient takes on a lemon-color tint, and the skin is waxy in appearance, and, though emaciation does not take place, the tissues lose their tonicity and become flabby.

Respiration is short and hurried on the slightest exertion, and there is sometimes pain, more often a sense of constriction of the chest. The pulse may be full, but is soft and easily compressed; generally, however, it is small and feeble. Hemorrhage may occur in the retina, giving rise to disturbed vision. There also may be bleeding from the nose, lungs, urethra, and uterus. As the disease progresses, the ankles swell, debility increases, and the patient takes to his bed.

In advanced cases there may be an irregular fever, anemic fever, though the temperature range is usually low. The lips and gums are pale and bloodless. The mind wanders, and he sinks into a half-torpid state. If we examine the heart during this stage we find the cardiac sounds feeble and hemic murmurs common, especially over the base of the heart.

Treatment may give rise to some encouragement, but a relapse occurs sooner or later, and the patient dies from exhaustion.

Diagnosis.—This is usually not very difficult, though it may be mistaken for malignant growths, kidney lesions, and various grave diseases. The age of the patient and the slow, insidious manner in which the disease begins, should arouse our suspicions. The increasing pallor changing to a lemon-tint, with waxy skin, the inelastic, doughy tissues, the absence of emaciation, the tired, wearied condition of the patient on the slightest exertion, the quick and hurried breathing, would suggest anemia. If retinal hemorrhages are found, they confirm the diagnosis. Microscopical examination of the blood not only reveals a marked decrease in the red blood-disks, 1,000,000 or less per millimetre, but also reveals large nucleated red blood-corpuscles, megalocytes and various sized and shaped corpuscles.

Cancer is apt to occur late in life; there is greater emaciation, more pain, and a local tumor can usually be outlined.

Prognosis.—All writers agree that pernicious anemia is a very grave disease, and that very few cases recover. Under the administration of arsenic, some cures are recorded, though a patient, seemingly cured, is apt to have a relapse within five years and die. A few permanent recoveries are recorded.

Treatment.—All schools of medicine agree that arsenic is the one remedy that promises greater relief than any yet tried.

While administering this agent, we are stimulating the blood-

making organs, with the hope of getting a better elaboration of blood. Pure air, outdoor exercise, and an easily digested diet will assist materially in bringing about the desired result. If the patient complains of great weariness, rest in bed should be enjoined. Daily or triweekly injections of normal saline solution may prove of some value. Should recovery take place, the patient should, at the first indication of its return, resort to arsenic.

SECONDARY ANEMIA.

Synonym.—Symptomatic Anemia.

Etiology.—All cases of anemia occurring in the course of other affections, or due to hemorrhage, are classed as secondary anemias, the various causes being included in the following classification:

Hemorrhage.—The loss of blood may be rapid and in large quantity, giving rise to an acute anemia, as where the hemorrhage is due to injury of the blood-vessel, either from serious wounds or from the rupture of an aneurism, or from flooding during parturition. In these cases, there is loss of all the constituents of the blood. When sudden and in large quantities there is danger of fatal syncope. Severe hemorrhage may arise from gastric or duodenal ulcers.

The patient may lose considerable blood in hemophilia, scurvy, and purpura, though in these cases the loss is not so rapid.

The loss of blood may be small in quantity each day, but when continued for several days or weeks, gives rise to severe anemia; thus in epistaxis, bleeding piles, uterine hemorrhage, or cirrhosis of the liver, we have examples of a large loss of blood, extending over a period of days or weeks, and which may be considered as chronic anemia.

Inanition.—This may be due to insufficient food, or the quantity may be sufficient, but lack the constituents necessary for the elaboration of a normal blood supply, or, having a sufficient quantity and quality of food, there may be wrongs of the digestive apparatus whereby digestion and assimilation are impaired, thus cancer of the esophagus or stomach, or atrophy of the gastric mucous follicles, or cirrhosis of the liver, would result in a failure to manufacture good material into blood.

Wrongs of the sympathetic nerve, as seen in lesions of the rectum, uterus, and urethra, may so impair the blood-making organs as to give rise to anemia.

Albuminous Waste.—A long, continuous drain upon the albuminous material of the blood, as in chronic nephritis, long-continued suppuration, chronic diarrheas, profuse leucorrhea, and prolonged lactation gives rise to anemia.

Toxic anemia results from certain organic and inorganic agents; thus, arsenic, lead, phosphorus, and mercury are well-known blood destroyers, and the poison from venomous snakes acts in the same way. Of the chronic infections, syphilis, tuberculosis, and malaria are marked examples, and, not infrequently, typhoid fever, pyemia, septicemia, diphtheria, and kindred diseases give rise to anemia. Various intestinal parasites also play some part in producing anemia.

Pathology.—The condition of the blood varies from the slightest impairment to the gravest form of anemia, depending upon the severity and duration of the producing cause, and upon the power of blood renewal. The number of red corpuscles and the percentage of hemoglobin are proportionately diminished, while the red corpuscles remaining, vary in size and shape, some being unnaturally small (microcytes) and others unduly large (macrocytes), while still others are of irregular sizes (poikilocytes). Nucleated red cells are also found, and usually there is an increase in the leukocytes, the exceptions being in tuberculosis, enteric fever, measles, influenza, and malaria. The alkalinity of the blood is generally slightly diminished, the specific gravity reduced, and the watery elements increased, rendering the blood more fluid, and the color of the entire fluid being more pale than normal blood.

The fluid and albuminous principles of the blood are quickly restored, the corpuscular elements following next in order, and the hemoglobin last, in some cases the last constituent requiring months before it reaches the normal standard.

Females can lose a much larger quantity of blood and recover quicker than males, though infants of both sexes do not bear the loss of much blood.

Symptoms.—Pallor of the skin, colorless appearance of the ears, and particularly of the mucous membranes, are among the

early symptoms of anemia, though we must remember that not all pale people are anemic, nor that all anemic people are pale.

Cardiac Symptoms.—The pulse is usually small and rapid, of low tension, though a high-tension pulse is sometimes encountered. Palpitation and attacks of syncope are not uncommon. The heart, being poorly nourished, is apt to lose its muscular tone, attended by slight dilatations; as a result, a systolic hemic murmur may be heard over the pulmonary area, and transmitted to the axilla. The murmurs arise from dilatation of the left ventricle, which gives rise to relative mitral insufficiency.

Dyspeptic symptoms are nearly always present; the tongue is pale, broad, and flabby, the appetite poor, some headache, and generally there is constipation.

Pulmonary symptoms are present when the anemia is well developed. A slight hacking cough is common, and dyspnea, on slight exertion, usually attends, and occasional sighing may be noticed.

Cerebral Symptoms.—Cerebral anemia is indicated by spots appearing before the eyes, ringing in the ears, and vertigo. Mental apathy and inability to concentrate the mind is not an uncommon symptom. The patient complains of a pain in the top of the head.

Nervous symptoms are not infrequently present, the patient being irritable and restless at night, though drowsy and passive during the day. The patient may complain of hot or cold flashes, crawling or creeping sensation of the skin, and vague pains in different portions of the body. Menstruation is disturbed; at first there may be menorrhagia, but later, the flow becomes pale, scanty, and finally ceases. Generally debility is noticed, and in extreme cases a low temperature is noted.

Edema of the ankles and legs are common, and where tuberculosis or cancer are present, emaciation is a marked feature.

Diagnosis.—A grouping of the above symptoms are so characteristic that the diagnosis is rendered comparatively easy, but a positive diagnosis is only made by examination of the blood.

Prognosis.—This depends upon the primary lesion that gives rise to the disease, and our ability to overcome it.

Treatment.—The treatment depends upon the cause. If due to traumatic hemorrhages, and they have been arrested, rest,

good nutritious food, and plenty of fresh air and sunshine, will be all that is required. If due to hemorrhoids, they should be removed; or from menorrhagia, suitable treatment should be instituted to overcome it.

The patient should be examined very carefully as to the cause or causes giving rise to it, and the treatment directed to removing it. The idea that iron and arsenic are to be given whenever anemia is present, is a fallacious one.

Wrongs of digestion are to be corrected, constipation must be overcome, and the nervous system built up. Each case will need a special study, and special remedies required for individual cases. Copper, iron, and arsenic will be useful agents in connection with the specially indicated remedy; but, above all, do not forget to give the patient fresh air, plenty of sunshine, nourishing food, sponge-baths, and moderate exercise.

LEUKEMIA.

Synonym.—Luekocythemia.

Definition.—A constitutional disease, of unknown causation, and characterized anatomically by changes in the spleen, lymphatic glands, singly or combined, and accompanied by a marked increase in the white corpuscles and a decrease in the red.

History.—This rare, but peculiarly interesting disease, was first described by Dr. Hughes Bennett in 1845, and a few weeks later, though independently, by Virchow. Bennett, in holding an autopsy upon a man who died with a very much enlarged spleen and liver, found the blood filled with corpuscles resembling pus-cells, and yet there was no evidence of phlebitis, nor any reason to suggest pyemia, there being no local suppurative process. He therefore came to the conclusion that he was dealing with new pathological conditions in which pus-corpuscles were generated within the blood. He did not undertake to say, however, what relation, if any, the spleen and liver bore to the diseased condition.

A little later Virchow, independently, described a similar case, but declared that the corpuscles in question were not pus-cells, but white cells of the blood in very greatly increased quantities, and that there was a direct relation between the enlarged spleen and the increase of white corpuscles, and suggested the

name leukemia. Bennett claimed priority of discovery, and named the lesion leukocythemia. Since then, much attention has been given to the disease, though but little light has been thrown upon the causation.

Varieties.—The older writers recognized two forms of leukemia—the splenic, in which the spleen was enormously enlarged, and the lymphatic, in which, while the spleen was somewhat involved, the chief characteristic was the enlargement of the lymphatic glands. These were for a time regarded as distinct pathological types, but since Neumann's discovery that the bone-marrow is the principal seat of the origin of the blood, especially of the leukocytes, and since it has been demonstrated that in both splenic and lymphatic leukemia the marrow-cells are involved, and that the spleen is enlarged to some extent even in the lymphatic form, the old division has been discarded, and that of Ehrlich and Lazarus has been generally accepted; namely, (1) Myelogenous leukemia (a growth of myeloid tissue); (2) Lymphatic leukemia (a growth of lymphoid tissue).

MYELOGENOUS LEUKEMIA.

Synonyms.—Myeloid Leukemia; Splenic Myelogenous Leukemia; Splenic Leukemia; Leukocytic Leukemia.

Etiology.—This is a very rare disease, and but little is known as to its determining cause. It occurs more frequently in males than females, and between the ages of twenty and fifty, though no age is exempt. It is found in all parts of the world, and among all races, though, according to Eichorst, the Jews are the most likely to suffer. Heredity seems to play an important part, while syphilis, malaria, unhygienic conditions, and injuries to the bone or spleen have been considered as predisposing, though they may be only coincident factors. Whether it be due to auto-infection or to bacteria is yet to be determined, though, whatever the cause, it affects directly the blood-making organs.

Pathology.—*The Blood.*—This is generally of a pale or creamy color, and contains Charcot-leyden crystals. When leukocytosis is extreme, it resembles lymph or is milk-like or puriform, while at other times it may be of chocolate color.

It is less alkaline than normal blood, is of lower specific gravity, undergoes decomposition more rapidly, and does not coagulate so readily. The most characteristic factor of the disease is the great increase in the number of the leukocytes, there being 100,000 to 200,000 white corpuscles per cubic millimeter in a case of moderate severity, and a corresponding increase in the more severe cases, the relation of the white corpuscles to the red being as 1 to 2 or 1 to 1, and Robin states that the leukocytes may even double those of the red.

The Bone-Marrow.—Changes in the bone-marrow occur in both the long and spongy bones, the characteristic lesion being the "pyoid" transformation. The light appearance of the normal marrow is replaced by a yellowish or puriform color; this may be uniform, or scattered areas may be seen. In the early stage it may be firm in consistency, but as further changes take place, there is a tendency for it to liquify.

There is a marked increase in the colorless marrow-cells, and round hemoglobin free cells, with large pale nuclei and many fine granules possessing neutrophilic properties.

Spleen.—The spleen in the early stage is hyperemic, of a dark color, and very much enlarged, not infrequently extending downward to the spine of the ilium and forward to the median line. Infiltration and proliferation of lymphoid cells take place, the spleen becomes hard, and on section it presents a variegated appearance, due to small areas of fatty degeneration or necrosis, which are scattered throughout the organ, and which are due to pressure from the excessive infiltration; or there may be fibroid degeneration. In some cases there is hyperplastic thickening of the capsule with adhesions to the surrounding structures.

The Lymphatic Glands.—Though they are usually somewhat enlarged, they are secondary to myeloid leukemia, and may not be noticeable. It is simply an infiltration of the gland with leukocytes, and not a hypertrophy of lymphoid tissue. Similar infiltrations of leukocytes are found in most of the organs of the body.

The Liver.—In most of the cases examined the liver is found enlarged; but how much of this is due to hyperplasia of the liver tissue, and how much to a lymphomatous development, has not been determined.

Heart and Vessels.—Infiltrations are found in the heart and

sometimes in the walls of the blood-vessels, but are due to secondary conditions.

Leukemic Retinal Changes.—With the ophthalmoscope, small infiltrations may be seen in the retina as small whitish spots, while the retinal veins are greatly enlarged, though the arteries remain normal.

Symptoms.—It is somewhat astonishing how well nourished many of these patients are, even after the alterations of the blood and enlargement of the spleen; many times the discovery of the disease is made when examining the patient for some intercurrent affection. In the advanced stage the patient complains of feeling weak and prostrated, bodily effort being difficult. The patient complains of pain in the side, there is hurried and oppressed breathing, more or less palpitation of the heart, loss of appetite and gastric disturbance, hemorrhage from the nose or gums; in fact, there may be hemorrhage into the various organs; pain and tenderness in the sternum and long bones, pallor of skin and mucous membranes, and marked anemia are the most characteristic symptoms. The temperature is quite erratic, in some cases being normal, subnormal in others, while a third class will show fever.

Diagnosis.—The diagnosis can only be made by the aid of the microscope, and, according to Lazarus, must show the following four conditions:

“1. The granular mononuclear leukocytes (Ehrlich’s myelocytes) must constitute a considerable number of all the white blood-cells. Their appearance in the blood is always somewhat abnormal; yet in nonleukemic cases, even when their percentage is moderately high, their absolute number is small, in fact far below the smallest numbers ever observed in myeloid leukemia.

“2. The eosinophilia mononuclear and polynuclear cells must be considerably increased. Their percentage may not be greater than a high normal (three-quarters per cent), yet their actual number per cubic millimeter is incomparably greater than in the most marked cases of pure eosinophilia yet observed.

“3. The mast cells must show a great absolute increase.

“4. Nucleated red blood-corpuscles of especially normoblastic type must be readily found. All of these characteristics must be present simultaneously.”

Prognosis.—Medication has thus far proven of but little benefit, the patient dying sooner or later.

Treatment.—As already stated, medicines have had but little influence on the disease. Rest in bed, a nutritious and easily digested diet, Fowler's solution of arsenic, iron in some form, bone-marrow and oxygen inhalation, have been recommended. Polymnia deserves a trial.

LYMPHATIC LEUKEMIA.

Synonym.—Lymphemia.

Definition.—A leukemia characterized by an increase in the lymphocytes and enlargements of the lymphatic structures.

Etiology.—As in myelogenous leukemia, various theories have been suggested, but none satisfactorily proven.

Pathology.—Hemorrhages occur in the skin, the retina, the mucous membrane of the intestinal tract, the pleura, pericardium and peritoneum, the pelvis of the kidney, and sometimes into the brain, and, if in the motor region, give rise to paralysis.

The lymph glands are universally enlarged, hard and firm in consistency, marrow-like and white, unless hemorrhage occur, when they are pink.

The spleen may be normal in size, though usually slightly enlarged, and in children it occasionally is of enormous size. It is soft, confluent, and of a brownish red or chocolate color.

The Bone-Marrow—The changes in the marrow are constant and characteristic, usually affecting the tubular bones throughout their entire extent; the marrow is red in color, and the consistency of jelly.

The "characteristic change produced in the blood by lymphatic leukemia is the tremendous increase in the absolute number of circulating lymphocytes. While in healthy blood these constitute less than thirty per cent of the whole number of white cells, in this condition they form over ninety per cent of a total leukocyte count, which is many times the normal."

Symptoms.—*Acute Lymphatic Leukemia.*—The onset is sudden and the course rapid, the disease terminating in a few days or weeks. The symptoms are those of an infectious disease, there being fever, nausea, vomiting, and diarrhea. Hemorrhages

into the skin and mucous surfaces are characteristic, attended by anemia. The enlargement of the lymphatic glands is never so marked as in chronic lymphatic leukemia, in fact, may not be noticeable till near the close of the disease. As the disease progresses, it assumes a typhoid type, with delirium, coma, and finally death. A painful and somewhat characteristic symptom is severe ulceration of the mouth and gastro-intestinal tract. Acute nephritis is sometimes present.

Chronic Lymphatic Leukemia.—This form comes on slowly and insidiously, the enlargement of the lymphatic glands being the first symptom, many times, to call attention to the disease. The first to be noticed are the cervical, to be followed in turn by the axillary, inguinal, etc., till all the glands of the body become affected. They gradually increase in size, are usually soft, though they rarely suppurate. Occasionally they are quite firm. The spleen is enlarged, but not to the extent as seen in the myeloid form.

As the glands enlarge, the patient becomes anemic; there is failing strength, and emaciation more or less marked, are the danger-signals of an incurable malady. Hemorrhages may occur late in the disease.

The disease runs its course to a fatal issue in from one to three years, though occasionally it terminates in a few months, through some intercurrent disease, like pneumonia, tuberculosis, and kindred diseases.

The treatment of all forms of leukemia is unsatisfactory; the most we can do is to retard, to some extent, the progressive changes by symptomatic treatment. Outdoor life in a suitable climate, a nutritious diet, and arsenic, the bitter tonics, and iron, may accomplish some good.

HODGKIN'S DISEASE.

Synonyms.—Pseudo-leukemia; Lymphadenoma; Anemia Lymphatica; Lymphasarcoma; Malignant Lymphoma, etc.

Definition.—A chronic disease characterized by enlargement of the lymph glands, a progressive anemia, and often attended by secondary growths of lymphoid tissue in the liver, spleen, kidneys, bone-marrow, alimentary tract, and other organs.

Etiology.--The causes of this disease are as obscure as those of leukemia. About seventy-five per cent of all cases occur in males, and the majority of cases occur under forty years of age. Syphilis, malaria, tuberculosis, rickets, chronic diarrhea, and other affections are given by some writers as predisposing causes, but just how far these diseases have been coincident factors and how far they have really influenced the disease, it is impossible to say. Unhygienic conditions seem to favor the affection, since the majority of cases occur among the lower classes.

The course of the disease in some cases, especially the occurrence of fever of an irregular type, but a recurring type, and the rapidity with which some of the cases run a fatal course, strongly points to an infectious nature. Recent studies in bacteriology suggest micro-organisms as a probable cause, though nothing specific has yet been discovered.

Pathology.--The pathological changes found will depend upon the stage of the disease. Generally the first changes are noticed in the cervical glands, and these in turn by the axillary glands, and finally the inguinal glands become involved. The affected glands are first isolated, and freely movable, and are about the size of almonds, but as the disease progresses, they become adherent, forming a tumor mass from the size of an orange to that of a coconut. These cervical lymphatics may form a chain extending down the trachea and large blood-vessels to the axillary glands.

The mediastinal glands, enlarging, may encroach upon the blood-vessels, and occasionally perforate the sternum and appear as external tumors.

Any of the glands of the body may become involved. When the mesenteric and retroperitoneal glands are the seat of the trouble, the diagnosis becomes somewhat difficult, laparotomy having been performed for abdominal tumors, only to find masses of enlarged lymph-glands.

As the disease progresses, lymphoid deposits take place in other organs, especially the spleen, thymus gland, and sometimes the liver and kidneys. More rarely the skin becomes the seat of lymphomatous growths. The consistency of the glands vary, being soft and jelly-like or firm, hard, and dry. The early stage generally reveals them to be of firm consistency; but as the disease advances, there is a proliferation of the connective

tissue-cells, which may change the soft gland into one of almost stony hardness.

A cut section reveals this varied condition, and if made of the spleen, shows a dark-reddish, pulpy mass, interspersed by lighter sections of connective tissue. This gland rarely caseates, and when this does occur, it is probably due to secondary conditions, notably tuberculosis.

According to Stengel, the blood of pseudo-leukemia is distinguished by the *absence* rather than the *presence* of alterations from the normal. The reduction of red corpuscles is usually slight, except in severe cases, where they may be reduced to 2,000,000 or even 1,000,000 per cubic millimeter, with alterations in their size and shape. The white corpuscles are about normal in number, though they may be slightly increased or diminished.

Symptoms.—The disease comes on so insidiously that the earlier symptoms are negative. If the superficial glands are the first to be involved, and this is the rule, the patient will notice a bilateral enlargement of a chain of cervical lymphatics; even before this, however, he has noticed a progressive loss of weight and strength. As the disease advances, his attention is called to the enlargement of the axillary glands, and finally to the inguinal glands.

There is generally loss of appetite, furred tongue, and dyspeptic symptoms; especially is this marked where there is atrophy of the gastro-intestinal mucosa. There is more or less dyspnea, which may arise either from the anemia present, or from pressure from the enlarged mediastinal glands, or from the bronchial glands, and in some cases from pressure upon the trachea by an enlarged tumor mass of cervical glands.

Edema of the ankles is not uncommon in the late stages of the disease. The presence of albumin in the urine is not infrequent. Hemic murmurs are present, and palpitation is a common symptom. Fever is present at some stage of the disease in nearly all cases; in some it is of an irregular type, while in others it will assume a remittent form. Where the skin is affected, ulceration is apt to occur.

Diagnosis.—In the early stage, Hodgkin's disease is not readily recognized, but when well advanced, the diagnosis is comparatively easy. A few characteristic points, if kept in mind,

will enable us to distinguish this from tuberculosis, thus: in pseudo-leukemia the cervical enlargement is usually bilateral, and involves the anterior or posterior chain of lymphatics, and there is no tendency to suppurate, while in tuberculosis the enlargement is usually confined to one side, involves the submaxillary chain, and the tendency is to suppuration. In the former, there is splenic enlargement and more pronounced anemia. To differentiate from leukemia, a blood examination is necessary.

Prognosis.—The prognosis is grave, but few cases recovering. The disease usually ends fatally in from one to three years, though an acute case may terminate fatally in three months.

Treatment.—Before there is an involvement of the general lymphatic system, the removal of local tumor masses in the neck may help stay the progress of the disease.

A good nourishing diet, plenty of air and sunshine, will be important factors in prolonging life.

Arsenic in the form of Fowler's solution has perhaps been more successfully used than any other one remedy. Phytolacca, iris versicolor, and like remedies deserve a thorough trial.

ADDISON'S DISEASE.

Synonyms.—Bronzed Skin Disease; Melasma Suprarenale.

Definition.—A chronic disease characterized by progressive asthenia. A bronzed pigmentation of the skin, irritability of the gastro-intestinal tract, feebleness of the heart's action, with degeneration of the suprarenal capsules.

Etiology.—The disease occurs most frequently between the ages of twenty and forty, and affects males more frequently than females. Blows and injuries to the back would suggest traumatism as a predisposing cause; the lesion is almost constantly associated with tuberculosis of the suprarenal capsules. A rare disease and one of unknown etiology.

Pathology.—Both capsules are usually involved, though occasionally but one is found affected, and in still rarer cases neither appear to be the seat of the disease, the disturbance being confined to the sympathetic plexus around the organs.

The glands are usually enlarged, firm, and nodulated, irregu-

lar in form, showing the characteristic caseous masses of the tuberculosis. In rare cases the tubercular lesion seems to be primary and confined to the capsules, though generally associated with tuberculosis of the lungs, bones, and viscera in general.

In some cases, owing to interstitial changes, fibrous tissue preponderates, or the glands may atrophy, becoming sclerotic, or they may be replaced by fatty deposits. Malignant growths may destroy their function.

In a few cases the pathological changes seem to be confined to the sympathetic, and consist of degeneration, congestion, hemorrhages, and infiltration by leukocytes, or new connective tissue in the ganglia and nerve fibers. Parenchymatous or fatty degeneration is sometimes found in heart, liver, and kidneys. The spleen, in some cases, is enlarged, showing more or less degeneration of its tissue. The blood shows the same changes that are found in anemia.

Symptoms.—*Asthenia.*—Prostration comes on gradually, but sometimes quite rapidly, and is shown by general lassitude. The patient complains of always being tired, and is unrefreshed by his night's rest. He becomes weak, listless, takes but little interest in his surroundings, and grows peevish or despondent. The prostration is progressive.

Cardiac feebleness is manifested by occasional attacks of syncope, any one of which may prove fatal. The pulse shows characteristic weakness, though it may be quite rapid. The heart-sounds are quite feeble. As the disease advances, there is palpitation of the heart, and dyspnea of a distressing character upon slight exertion. Disturbance of vision, dizziness, ringing in the ears, headache, and various other cerebral symptoms appear. In the last stages, stupor, delirium, and coma may follow one another in quick succession, terminating in convulsions and death.

Gastro-intestinal symptoms are nearly always present. Nausea and vomiting are among the early symptoms, and may persist to the end. At times it is violent, coming on in paroxysms, and does not appear to be due to any wrongs of the stomach, as the tongue may be clean and digestion fair, but to irritation of the sympathetic. Diarrhea is the rule, and accompanies the gastric disturbance. Pain in the epigastric, hypochondriac, and lumbar regions is not uncommon.

318 DISEASES OF THE BLOOD AND DUCTLESS GLANDS.

Pigmentation of the skin gradually appears in the form of a bronze or copper color, after the constitutional symptoms become well marked, though it may be among the first symptoms observed. It usually begins upon the exposed parts of the body, as the face, neck, and hands, and where natural pigmentation is most marked, as around the areola of the nipple, in the axilla, and around the genital organs and in the groin.

The color varies from a yellowish-brown to an olive or bronze color, the patient assuming sometimes the hue of a mulatto. The mucous membrane of the mouth and vagina may show bluish or purplish patches of discoloration.

Renal symptoms may or may not be present; thus polyuria is seen in some cases, while in others the quantity is but little affected. There is but little emaciation, though general evidence of anemia is present. The temperature is normal or subnormal.

Diagnosis.—In typical cases, the diagnosis is comparatively easy. The marked asthenia, feebleness of heart and circulation, gastro-intestinal irritation, anemia without emaciation, and the bronze or brown discoloration, are a group of symptoms that can hardly be mistaken. In atypical cases, where the constitutional symptoms are slight, the diagnosis becomes more difficult. It may be mistaken for malignant or tuberculous lesions of the abdomen, or cirrhosis of the liver, for pregnancy and uterine diseases, protracted cases of jaundice, chronic malaria, nitrate of silver discolorations, arsenic pigmentation, vagabond's disease, and other lesions that are attended by more or less pigmentation of the skin.

Prognosis.—The prognosis is unfavorable, the disease usually terminating fatally in from one to two years, though in rare cases the patient may live five or even ten years.

Treatment.—The treatment will be along the same line as suggested in leukemia, and will consist of hygienic, dietetic, and medicinal measures. The patient should avoid overexertion, either mental or physical, lead a quiet life in the open air and sunshine, take light, easily digested, and nutritious food.

Various drugs, such as iron, arsenic, the iodids, guaiacol carbonate, and many others, have been used, but are of doubtful value. The stomach may be quieted with small doses of ipecac, peach-tree infusion, bismuth, and rhus tox., and cactus may have

some influence in strengthening the heart, but we are not to expect too much from medication. The administration of the extract of suprarenal capsules has many advocates, and a few cases have been reported benefited from their use, though the remedy has not been tried sufficiently long to warrant us in hailing it as a specific.

MYXEDEMA.

Synonyms.—Sporadic Cretinism; Athyria.

Definition.—A chronic constitutional disorder, due to functional derangement of the thyroid gland, and characterized by infiltration (myxedema) of mucin in the subcutaneous tissues.

Varieties.—Three varieties are given: (a) True myxedema, or adult myxedema; (b) Sporadic cretinism; (c) Operative myxedema, or cachexia strumipriva.

The removal of the thyroid gland in lower animals demonstrates that the myxedema of adults, cretinism, and the cachectic condition following the removal of the thyroid gland for goitre, represent the same morbid condition though under different circumstances.

Etiology.—The secretions from the ductless glands possess various constituents that are necessary to normal metabolism, and when their function is impaired, and these constituents are absent or perverted, disorders of nutrition follow.

The thyroid secretion contains such a constituent, which has been named thyroidin, and when this is absent, myxedema results. More cases have been found in England and Switzerland than from all other countries. Women suffer more frequently than men, the ratio being 6 to 1.

It occurs most frequently between the ages of thirty-five and fifty. Pregnancy seems to predispose to it; at least married women who have borne children suffer more often than the unmarried.

Heredity may play some part as a predisposing factor, and exophthalmic goitre may bear some relation to the disease.

Actinomycosis has been reported as destroying the gland in a reported case of myxedema.

Pathology.—Lesions of the thyroid are constant, there either being atrophy or degeneration. The gland may be congenitally

absent, as in cretinism. Occasionally it is larger than normal, the secreting structure being replaced by interstitial fibrous tissue. Myxomatous changes in the blood-vessels and kidneys have been recorded.

Symptoms.—The disease comes on insidiously, the first symptoms appearing in the face, which loses its expression and takes on a coarse or bloated appearance. There is puffiness of the eyes, and the patient is dull and stupid. The tongue is broad, thick, and more or less coated. The nose increases in breadth, becomes flattened, and is inclined to turn up at the end. The lips become thick, the lower sometimes being slightly everted; the ears are enlarged, and the hair becomes coarse and is inclined to drop out. The skin becomes dry and harsh; the teeth decay, and the nails are dry and brittle.

The extremities become large and clumsy, and the hands and feet are swollen and become less flexible, and the body generally increases in bulk. The movements of the patient are slow. The heart's action is feeble, though the pulse may be rapid. The temperature is normal or subnormal. There may be traces of albumin and sugar in the urine.

The mental faculties become dulled, the patient reasoning with difficulty, taking on more and more the appearance of imbecility as the disease progresses.

Headache is often present, and the special senses, smell, taste, sight, hearing, and touch, become impaired.

Diagnosis.—The general swollen or bloated appearance, yet absence of pitting on pressure, the dry, harsh skin, the dull besotted appearance, the clumsy movements, are symptoms not likely to be mistaken for any other lesion.

Prognosis.—The disease is one of marked chronicity, lasting five, ten, or fifteen years. Since the introduction of the thyroid-gland treatment, many favorable reports have been received as to its curative action.

The thyroids of sheep and calves are used, and may be given raw or cooked, or in the form of glycerin extract, or the dry powdered extract.

All forms of myxedema seem to respond to this treatment, if reports are to be relied upon. If the gland be destroyed or removed, the treatment is to be continued at intervals during life.

CRETINISM.

This form of myxedema follows either a congenital absence of the gland or loss of its function during the first few years of life. The chief symptoms are those that arise from lack of development, the child retaining an infantile appearance, both in its physical and mental make-up.

The first physical or abnormal conditions may not appear for six or eight months after birth, at which time it is noticed that the child's development seems to be arrested. The awful dread arises in the mother's mind that the baby is not "bright," which becomes verified as the months pass. The physical development is also remarkably retarded. The anterior fontanels remain open, and the head becomes enlarged, narrow in front, but large posteriorly. The face becomes large and bloated, the nose broad, flat, and slightly turned up at the end, the eyes appear to be widely separated, the ears are large, the tongue is broad and thick, and often protrudes from a large mouth. The complexion is waxy or of a dull, chalky color. The hair is coarse, and usually thin. Dentition is delayed, and the teeth early decay.

The neck is short and the clavicular fossæ are filled with fatty tumors. The body is short and stunted, the skin dry and harsh, the arms and legs are short, and the hands and feet puffy and enlarged. The abdomen is bloated and prominent, and the child is unable to stand alone. The whole appearance of the child is repulsive. The condition may not arise until three or four years after birth, and follow some one of the infectious fevers, which in some way impairs the function of the thyroid gland. There is arrest of mental development in either case, and the child becomes an imbecile.

Prognosis.—Congenital cases usually live but a few weeks or months, while those developing early in childhood may live for years.

Treatment.—The treatment is along the same lines as for myxedema in the adult.

OPERATIVE MYXEDEMA.

Removal of the thyroid gland for surgical reasons has resulted in the gradual production of the same conditions that are found

in myxedema of the adult or cretinism. These results are not apt to follow if a portion of the gland remains; hence the surgeon should be careful never to remove the entire gland, unless due to malignant growths. We are not to understand, however, that myxedema strumipriva always follows a complete thyroidectomy, for accessory glands elsewhere may prevent such a result.

GOITRE.

Synonym.—Bronchocele.

Definition.—This is a hypertrophy of a part or the whole of the thyroid gland, and occurs sporadically or endemically.

Etiology.—The exciting cause is unknown. Goitre occurs sporadically or endemically, and Sievere speaks of an *epidemic* occurring at Serdobal, Finland, where a teacher and *fifteen* children were suddenly attacked. Locality seems to favor the disease, for while it occurs in all countries, in certain districts, which have many points of resemblance, it occurs in far greater numbers, and is thus said to be endemic in such localities. Mountainous districts seem to favor its propagation. Thus it is common in Switzerland and Italy, in the Himalayas, and in the hilly districts of China.

In Ontario, Canada, many cases are seen. It is found more frequently in women than men, especially in this country, and is accounted for on the grounds that women drink more *water* than men, while in India both sexes drink the same amount of water, and are equally affected with goitre.

The disease usually appears shortly after puberty, especially in girls, where there is some derangement in the menstrual flow.

There seems to be some constituent of the water-supply in certain sections that favor the formation of goitre, though what that constituent is, no one has been able to determine. A change in the water-supply, where goitre has prevailed, has led to a disappearance of the disease.

Heredity.—In some families heredity seems to play an important rôle.

Pathology.—The gland undergoes various degenerative changes, and has been divided by Murray into four varieties: (a) Hypertrophic or parenchymatous goitre; (b) Adenoma of the

thyroid gland; (c) Fibrous goitre; (d) Cystic goitre. Besides these types there may be various combinations.

In parenchymatous or hypertrophic goitre there is a hyperplasia of all the original tissue-elements. It may be confined to one lobe or involve the whole gland. "Adenoma of the thyroid occurs as an encapsuled growth, there being one or more nodules in one or both glands; the structure resembles that of the gland itself.

"In a fibrous goitre we have, in addition to overgrowth of the glandular substance, a large increase in the fibrous tissue, which may occur as bands running through the substance of the goitre or as fibrous nodules.

"Cystic goitre occurs, either as a result of expansion and coalescence of the follicles of an already enlarged gland, or as the result of softening of portions of the goitrous tissue; such goitres often contain a large amount of fibrous tissue and are distinguished as fibrocystic goitres." (Murray, "Twentieth-Century Practice.")

Symptoms.—As a rule the first evidence of goitre is a visible enlargement of the neck, and though, on swallowing, a pronounced tumor mass is seen to move upward, the patient experiences no pain. The growth develops slowly, is not attached to skin nor deeper tissues as a rule, and may be readily moved. They vary as to size, from one that is barely perceptible to one of enormous proportion, interfering with the movements of the head. When deep seated and it presses upon the trachea and esophagus, respiration and deglutition are rendered difficult, and dysphagia occurs more frequently than dyspnea. Cerebral disturbances, with convulsions, have been reported, though such symptoms must be exceedingly rare.

The general health is not affected, unless inflammation and suppuration attack the goitre, in which case there will be more or less systemic disturbance.

Diagnosis.—Goitre is easily diagnosed from other cervical affections. The constant location, the absence of pain, and the vertical movement during deglutition, can hardly be mistaken for other affections.

Prognosis.—This is favorable so far as the life and general health is concerned, but too much must not be expected from

medication, except in recent cases. Where fibroid changes have taken place, thyroidectomy promises the only relief.

Phytolacca.—I know of no one remedy that promises more in the cure of goitre than *phytolacca*, when given in tangible doses. Two drams of the tincture to water four ounces, and a teaspoonful every four hours. *Iris versicolor* may be used in alternation or combination with the above. Galvanism has been successful in my hands in a few cases.

Colorless iodine should be thoroughly applied night and morning. Thyroid feeding has been highly extolled, and may be given a thorough trial.

EXOPHTHALMIC GOITRE.

Synonyms.—Graves' Disease; Basedow's Disease.

Definition.—A disease characterized by enlargement of the thyroid gland, tachycardia, protrusion of the eyeballs, tremors, and generally derangement of the nervous system.

Age, sex, and heredity may be mentioned as the predisposing causes of the disease.

Age.—Although Deval records a case following scarlet fever in a child two and a half years old, and Charcot mentions a case at sixty-eight years of age, the disease is very rare at the extremes of life. Bramwell states that in women the disease occurs most frequently between the ages of fifteen and thirty, and in men between the ages of thirty and forty-five.

Sex.—Women are very much more prone to exophthalmic goitre than men. Out of four hundred cases recorded, forty-three were males and three hundred and fifty-seven females, a ratio in favor of women of 83 to 1.

Heredity.—The frequency with which several members of a family have been recorded as suffering from the disease, leaves but little doubt as to the influence of heredity.

Of the exciting causes no specific factor has been found, though nearly all writers agree that wrongs either of the cerebro-spinal or sympathetic system of nerves lie at the foundation of the disease. Thus great and prolonged worry, excessive grief, anger, or fright, excessive mental or physical exertion, and severe shock precede the disease. There are other exciting causes such as nasal affections, pregnancy, sexual excesses, severe acute diseases, goitre, and others; the variety and number of causes

assigned to the disease being the best proof that the true etiological factor is still unknown.

Pathology.—The chief feature in the hypertrophied thyroid gland is the increase in the secreting structure together with increased vascularity. It is uniformly enlarged. The protrusion of the eyeballs is due to dilatation of the blood-vessels of the orbit and an excess of the retro-orbital fat. There are no constant changes in the heart. In some there is dilatation and hypertrophy, though many cases show no changes whatever. The same may be said of the nervous system; no constant lesion can be found peculiar to exophthalmic goitre. The thymus gland is often found enlarged.

Symptoms.—The disease may be divided into acute and chronic.

Acute Form.—This is a rare form, and may speedily terminate in death. It is characterized by exceedingly rapid heart-action, great irritability of the stomach and bowels, resulting in persistent vomiting and purging, protrusion of the eyeballs, tremor, and sometimes marked cerebral disturbance.

Chronic Form.—In most cases the invasion is gradual, the tachycardia being the earliest and most constant symptom. It varies from 80 to 90 or 100 beats per minute to 120 to 150 or even 300 per minute, depending upon excitement and physical exertion. Gradually the thyroid increases in size; though in rare cases it remains almost unnoticeable. The bulging of the eyeball is also progressive, and when developed is most characteristic.

Von Graefe's Sign.—This consists in the failure of the upper eyelid to descend upon the eyeball when it is directed downward. Normally, as the eyes follow a descending object from a level above the eyes to one below them, the lids descend with the downward movement of the eyeball, and in none is the white sclerotic coat brought into view, but in exophthalmus the white sclerotic is markedly visible, constituting Von Graefe's sign.

Tremor.—This is also a constant symptom, and is best observed by having the patient extend the hand, palm upward.

General nervousness is also found in most cases, the patient being exceedingly nervous and restless, is easily disturbed, and magnifies small incidents and happenings out of the ordinary; is inclined to be pessimistic and melancholy. Insomnia is very common, the patient having great difficulty in getting to sleep.

Gastro-intestinal disturbances are the rule, diarrhea occurring at intervals and lasting from one to three days. Gastric distention of the stomach, attended by irritation, is a frequent complaint. Respiration may be increased in frequency, due either to cardiac disturbance, anemia, or to pressure from the enlarged thyroid. At times it is normal.

Cutaneous Symptoms.—Pigmentation, while not a constant symptom, is often present, being especially prominent at those parts where the pigment is naturally abundant, such as the areolar tissue around the nipple, and in the genital region. The face is sometimes of a darker hue than in health. Profuse sweating is not an uncommon symptom.

The general health is always more or less impaired. Wrongs of digestion, impaired innervation, and impaired circulation, soon give rise to muscular weakness, anemia, and more or less emaciation.

Diagnosis.—The diagnosis of Graves' disease is readily made by the presence of tachycardia and muscular tremors, even though other characteristics are absent, and when we add to the above symptoms, enlargement of the thyroid and the bulging of the eyeballs, the white sclerotic coat showing, there is no room for doubt.

Prognosis.—The prognosis is unfavorable as to cure, though the patient may live for years. A few cases will entirely recover.

Treatment.—The treatment will be hygienic, medicinal, and surgical. When possible, the patient should be sent to a climate of equable temperature, where there is a maximum of sunshine and of moderate elevation, from 2,500 to 3,500 feet.

Medicinal.—Aconite, veratrum, belladonna, cactus, strophanthus, ergot, digitalis, sodium salicylate, and many others, have been advocated, and when specially indicated may be of some benefit, though too much should not be expected from medicines. Galvanism has been highly extolled, and may prove beneficial in some cases.

Surgical.—Although of the one hundred and ninety cases reported by Starr where operative measures were taken, twenty-three resulted fatally, yet it promises more in the way of permanent relief than does medication, and with improved surgical measures the death rate of 12 per cent will be materially lessened.

PART VIII.

DISEASES OF THE NERVOUS SYSTEM.

I. DISEASES OF THE PERIPHERAL NERVES.

NEURITIS.

Definition.—An inflammation of a nerve or its fibrous covering. Neuritis may be confined to a single nerve, or involve a number of nerves, and may therefore be considered under separate headings,—local, or focal neuritis, and multiple neuritis.

LOCALIZED NEURITIS.

Synonym.—Focal Neuritis.

Etiology.—Cold is a common cause, involving especially the facial and sciatic nerves, and gives rise to the so-called rheumatic neuritis.

Trauma is perhaps the most frequent cause and may be due to stretching or tearing that so often accompanies fractures and dislocations, or it may be due to severe muscular exertion, or to wounds, contusions, or hypodermic injections, or the continued strain on certain muscles, as seen in professional palsies.

The various toxins found in the infectious diseases may act upon a single nerve, though usually they produce multiple neuritis. A nerve may be involved by an extension of an inflammation from some neighboring part.

Pathology.—The inflammation may be confined to the perineurium, the nerve-sheath, or extend to the deeper tissues—interstitial—or involve the axis cylinder—parenchymatous. Where

the sheath is involved, the nerve becomes swollen, hyperemic, and infiltrated with leukocytes.

Where the axis cylinder is affected—parenchymatous neuritis—degenerative changes take place, the nuclei of the nerve-cells consisting of oily-looking globules, a fatty degeneration.

Symptoms.—These depend somewhat upon the functions of the nerve involved. If a sensory nerve be the seat of the lesion, the pain is intense, and is of a burning, boring, aching, or shooting character. There is also tenderness on pressure, or when the muscles are moved. Although exquisitely painful, tactile sensation is materially lessened.

If a motor nerve be affected, there will be twitching of the muscles, supplied by the nerve, and if it assumes a chronic character, there will be paralysis and atrophy of the muscles.

Frequently both sensory and motor nerves are involved with a combination of symptoms.

Where the disease assumes a chronic form, trophic changes are manifest. There is a loss of faradic irritability, the skin becomes glossy and edematous, the nails become impaired, localized sweatings may arise, the surface temperature is sometimes increased, and there may be effusion into the joints.

Diagnosis.—We diagnose neuritis from neuralgia, the only lesion with which it might be mistaken, by the *continuous* character of the pain, which is increased by pressure. Altered sensation would also suggest neuritis.

Prognosis.—This is favorable in mild cases, the disease yielding within ten days or two weeks. If it assumes a chronic form, it may persist for months or years. If the continuity of the nerve be preserved, recovery will take place.

Treatment.—The part should have rest and support; where the pain is intense, a hypodermic of morphia may be required to relieve the pain. Hot applications generally afford more relief than cold ones. After tenderness disappears, much benefit will be derived from galvanism and massage.

When due to cold—rheumatic neuritis—the antirheumatics will be found efficient. Bryonia, apocynum, macrotys, rhamnus Californica, and the salicylates will be among the best.

If the skin is red, glossy, and edematous, apocynum is a good remedy. Jaborandi sometimes gives marked relief.

MULTIPLE NEURITIS.

Synonyms.—Polyneuritis; Peripheral Neuritis.

Etiology.—Insufficient and improper food, and exposure, are predisposing causes, and it is said to be more prevalent in females than in males.

Toxic agents are most frequently responsible for neuritis, alcohol heading the list, and while it occurs in persons using strong liquors, it may follow the use of malt drinks.

Of the metallic poisons, lead is the most frequent cause, phosphorus, arsenic, mercury, copper, and zinc following.

Of chemical poisons, bisulphide of carbon, coal gas, ether, naphtha, anilin, ergot, and morphia may be named.

Of the infectious diseases, diphtheria is the most frequent cause, typhoid fever, leprosy, scarlet fever, beri-beri, small-pox, influenza, and tuberculosis being less frequently the cause. Cachectic conditions, such as anemia, cancer, and tuberculosis may be responsible for it, and it sometimes follows rheumatism, gout, the puerperal state, and diabetes.

Pathology.—The pathology of multiple neuritis does not differ materially from that of neuritis occurring in isolated nerves. The lesion may be that of an interstitial neuritis, or of a parenchymatous neuritis, or both combined. Generally, the peripheral parts suffer more than the central parts.

The motor nerves alone may be involved as in lead-poisoning, or the sensory nerves may alone be affected as in coal-gas poisoning, or both may be involved as in the neuritis due to alcohol and the infectious diseases.

Changes in the spinal cord, such as meningitis, may occur.

Symptoms.—Since there are so many phases of multiple neuritis, it will simplify the description of their many phenomena by describing separately their principal forms.

Acute Febrile Polyneuritis.—The onset is sudden, and frequently resembles the acute infectious fevers. There is a chill followed by febrile reaction, the temperature rapidly rising to 103° or 104°; there is some tenderness in the spleen, and not infrequently some slight jaundice. There is pain in the head, back, and limbs, and sometimes swelling of the articulations, resembling rheumatic fever. Tingling, numbness, and muscular cramps frequently precede loss of power in certain muscles. The

extensors of the hands and feet are most commonly involved, giving rise to wrist and foot drop.

Paralysis rapidly extends up the extremities, and sometimes involves the trunk and face. Faradic irritability is lost, and the muscles rapidly waste. Death may occur in from seven to twenty-one days. In milder cases, after a few weeks of suffering, the patient gradually shows improvement, but a complete cure may not take place short of one or two years.

Alcoholic Neuritis.—This is the most common form of the disease, and occurs more frequently in women than in men. Its onset is usually slow, being preceded by impaired digestion, catarrhal gastritis, sleeplessness, irregular or feeble heart's action, and, as the patient expresses it, his feet and hands "go to sleep." There is tenderness along the course of the nerve-trunks, cramp in the muscles, with loss of power and paralysis of the extensor muscles of the upper and lower extremities, giving rise to the characteristic wrist and foot drop. Neuralgic pains, sensory disturbances, delirium and convulsions not infrequently occur, and sometimes result in insanity. Loss of control of the sphincters of the bladder and rectum sometimes occur. Atrophy of the affected muscles usually takes place. Anesthesia of the skin and hyperesthesia of the muscles is a characteristic condition.

Owing to paralysis of the extensor muscles, the "steppage gait" (lifting the foot high in the air and swinging the foot forward to avoid striking the toes on the ground) is a prominent symptom. There is loss of the superficial and deep reflexes. In some cases the patient passes into a low ataxic or typhoid condition.

Lead Paralysis.—This form is not attended by sensory disturbances and is usually preceded by anemia, lead-colic, obstinate constipation, and a characteristic blue line on the margin of the gums. The paralysis usually develops gradually, though in exceptional cases the onset is sudden.

The muscles supplied by the musculo-spiral nerve are more frequently involved than those of the lower extremities; hence the characteristic wrist-droop in lead paralysis. When the lower limbs are involved, the peroneal muscles are the first to be attacked.

The prognosis is generally favorable, and results in recovery in from four to six months.

Arsenical Paralysis.—This form is more apt to affect the lower extremities, and atrophy of the muscles is more rapid than in lead paralysis. Formication and numbness are the chief sensory symptoms. The “steppage gait” is generally well marked.

The condition of the reflexes and their behavior to electric stimulation are similar to those of lead-poisoning.

Carbon-bisulphid Neuritis.—In this form of neuritis there is intense pain in the head, dizziness, muscular cramps, and sometimes convulsions.

Coal-gas neuritis involves only the sensory nerves, is usually mild in character, though numbness may persist in the hands and feet for a long time.

Beri-beri, Kakke, or Endemic Neuritis.—This disease occurs endemically in Japan, China, the Philippines, and Northern Brazil. Its etiology is in doubt, and though many regard it as being due to micro-organisms, its specific character has not yet been determined. Predisposing causes are such as impair the vitality and lower the quality of the blood. Foreigners visiting or residing in endemic localities are apt to be exempt.

Symptoms.—The first evidence of the disease is a sense of weariness or weakness in the lower extremities. Soon a fever develops, the patient grows anemic, and edema develops, which is followed by general anasarca. There is painful atrophy of the muscles, and paralysis of the arms and legs occur. Vomiting sometimes occurs and the urine is usually scanty though not albuminous. If the phrenic nerve be affected, paralysis of the diaphragm may result in death.

Diagnosis.—A well-marked case of neuritis is not usually readily mistaken, but since a multiple neuritis frequently simulates poliomyelitis anterior, locomotor ataxia, and diffuse myelitis, the differential diagnosis may be readily understood by examining the table used by Ranney, and found in his work on Diseases of the Nervous System.

Prognosis.—The prognosis is generally favorable, though much depends upon the cause or rather form of the disease. When due to alcoholism, diphtheria, or beri-beri, the diagnosis should be guarded, since these are grave forms of the disease.

Treatment.—The treatment depends upon the wrongs present, and does not differ materially from that of other diseased

conditions. Where possible, the cause should be removed; if due to alcoholism, drink should be restricted, and if from lead, arsenic, bisulfid of carbon, etc., the patient should be removed from the exciting cause, and, as far as possible, endeavor to eliminate the poison. When due to infection, the antiseptics will be of much benefit.

Rest in bed, with support to affected parts, will afford much relief. When fever attends, the special sedatives are to be judiciously used. If the pain is intense, morphia hypodermically should be used, though it should not be continued indefinitely for fear of the morphine habit. When due to sepsis, echinacea, the sulphites, chlorates, and mineral acids will be called for. If due to absorption of lead, sulphur baths, and potassium iodid internally, and galvanism will give good results.

Rhus, bryonia, avena, rhamnus Cal., and melilotus will be useful agents under certain conditions.

The warm baths and massage are not to be overlooked.

NEUROMATA.

Definition.—Tumors of nerves, which are divided into true and false neuromata.

True neuromata are made up of *nerve-fibers*, and, in rare cases, of *ganglion cells*.

False neuromata are devoid of *nerve-tissue*, and are composed of fibrous, gliomatous, myxomatous, or sarcomatous tissue, and situated on or within the nerve-sheath.

Etiology.—Neuromata, when single, are generally due to traumatism, either surgical, as when nerves are divided, or accidental, as from puncture, as from the hypodermic needle, or other penetrating instruments.

When multiple, they are due to hereditary or some diathetic disease, as leprosy.

Pathology.—All neuromata are made up of a mass of nerve-tissue and are classified as—(1) Stump or bulbous neuromata, developing on the severed ends of nerves. (2) Subcutaneous neuromata, or "*tubercula dolorosa*," painful nerve-tumors lying just beneath the skin. (3) Nerve-trunk neuromata, usually mul-

tiple. (4) Plexiform neuromata, consisting of an interlacing of neural cords, beady or tortuous in character.

Symptoms.—Neuromata, as a rule, are not painful, and rarely cause symptoms, if we except the subcutaneous, or those in an amputation stump. Occasionally motor symptoms are present, and are manifested by frequent or constant twitchings. That epilepsy may result from these growths is shown by a cessation of the attacks upon a removal of the neuromata.

Treatment.—This is surgical, and in the subcutaneous form gives permanent relief. In the bulbar form the relief may be only temporary, the growths frequently recurring.

In false neuromata, especially when due to syphilis, the iodids, echinacea, and other antisiphilitics will be indicated.

NEURALGIA.

Definition.—Neuralgia is a term used to express a pain of varying character in the course of a nerve or its branches, in which there is no structural change. The pain is intermittent or remittent in character, and tends to shift from place to place. There are frequently painful points (*points douloureux*) in the course of the nerve.

Etiology.—*Predisposing Causes.*—Neuralgia is a disease of middle life, being very rare in children or persons of extreme age, and occurs in men more frequently than in women, though females of a neurotic temperament are quite often affected. Heredity seems to have some influence in giving rise to neuralgia, it frequently occurring in hysterical and epileptic families; in fact, the general physical condition predisposes to neuralgia, and persons reduced by sickness, severe physical or mental exertion, anemia, and mal-nutrition, are prone to this affection. Workers in paints and metal-workers are also quite likely to attacks of neuralgia, while rheumatism, gout, chronic nephritis, diabetes, and the infectious fevers favor neuralgia. Exposure to cold and wet is a frequent exciting cause, while pressure from morbid growths or inflammation of near-by tissues are not to be overlooked as causal factors.

Reflex conditions must not be overlooked, for some of the most severe forms of neuralgia are due to wrongs of the uterus,

ovaries, rectum, or urethra, or to disease of the teeth, nose, middle ear, sinuses, or antrum and to eyestrain.

Symptoms.—Pain is the most characteristic symptom, and is usually located in the course of a nerve. The attack may come on abruptly or be preceded by prodromal symptoms, such as chilly sensations, mental depression, uneasiness in the part, or a stinging, tingling, or burning sensation. When fully ushered in, the attack seems unbearable; the pain is lancinating, stabbing, burning, or boring in character, localized or darting to neighboring nerves.

The skin of the affected part may be quite sensitive, and painful spots can be detected, especially where the nerve becomes superficial. Sometimes the skin of the affected area becomes anesthetic, and may remain so for some little time after the attack ceases. Twitching or spasms of the muscles may occur during a paroxysm. Herpes often follows an attack.

Neuralgic paroxysms exhibit a marked tendency to periodicity. A paroxysm may last for a few minutes or for several hours.

Clinical Varieties.—*Trifacial neuralgia* (tic douloureux). In this form the pain is felt in one or more branches of the fifth nerve, more frequently the ophthalmic division.

The symptoms vary, from an occasional paroxysm of a mild type, to paroxysms of such excruciating intensity, and occurring so frequently, as to cause the patient to take his own life. Hyperesthesia of the skin of the affected part is common, and vasomotor phenomena frequently are present, such as flushing, sweating, increased lachrymation, and nasal secretion and salivation.

The pain is of a rending or boring character, and may be so severe as to cause great prostration. Spasms of the muscles may occur. The painful points are: the supraorbital foramen, when the first branch is involved; the infraorbital foramen, when the second branch is affected; and when the third branch is the seat of the lesion, the mental foramen will be the painful spot.

When the pain is long continued, trophic changes, such as erythema, formation of ulcers, induration or drying of the skin, loss of hair or local grayness take place.

Neuralgia of the Neck and Trunk.—*Cervico-occipital Neuralgia.*—Exposure to cold, or cervical caries, is the most frequent cause of this form of neuralgia. The pain is localized over the occipital and posterior parietal regions, the most painful spot be-

ing located between the mastoid process and the upper cervical nerve, where the great occipital nerve becomes superficial. Hypæsthesia of the scalp frequently occurs, and loss of hair is not uncommon.

Phrenic Neuralgia.—The pain is in the lower anterior thoracic region, at or near the insertion of the diaphragm. It is a rare condition.

Intercostal Neuralgia.—This is a common form of neuralgia, especially in anemic and hysterical women, the middle intercostal nerves of the left side suffering more frequently than the right. There is commonly a dull pain, with paroxysms of a stabbing character at intervals. Painful points are located under the angle of the scapula, beside the vertebra, and at the middle of the ribs.

Expansion of the chest increases the pain; hence respiration is shallow. Where the attack is severe and persistent, herpes zoster may appear, though this is usually associated with neuritis.

Neuralgia of the Extremities; Cervico-brachial Neuralgia.—In this form the sensory nerves of the brachial plexes are involved, the radial and ulnar nerves being affected more frequently than the median.

The pain is most often located in the axilla, along the course of the ulnar nerve, and when the circumflex nerve is involved, in the deltoid muscle. Tender points are found in the axilla, in the posterior border of the deltoid, the superior ulnar behind the elbow, the inferior ulnar in front of wrist, and the musculo-spiral nerve at the bend of the elbow.

Obturator neuralgia is frequent in women suffering with uterine or ovarian lesions, the pain extending along the inner side of the thigh as low as the knee.

Lumbar neuralgia gives rise to pain in the lumbar region, along the crest of the ilium, in the inguinal and femoral regions, and in the spermatic cord, scrotum, or vulva. If severe and located in the testicles, it may be attended by syncope.

Sciatica.—Next to facial neuralgia, sciatica is the most common, and affects males more than females. The pain may be uniformly distributed along the entire length of the nerve, though more frequently the paroxysm is most severe in the gluteal and popliteal regions; other painful spots are the middle of the thigh, below the head of the fibula, behind the external malleolus and the back of the foot.

The pain may be constant, though, usually paroxysms of intense pain, of a shooting, stabbing, or boring character, occur at irregular intervals. Damp weather seems to aggravate the attacks.

The pain is increased by walking or motions of the limb. In walking the knee is flexed and the patient throws his weight upon his toes, to diminish the tension on the nerve. Tremors or spasm of the muscles may be present, and when the disease is long continued there may be atrophy of the muscles.

Neuralgia of the Genitalia and Rectum.—Of all neuralgias, none are more severe or harder to bear than neuralgia of the rectum and genitals. Coccygodynia is a common affection in women, and is usually associated with other nervous affections. It is aggravated by the sitting posture. This form is often very intractable, resection of the coccyx having been resorted to in some very severe cases, though, unfortunately, not always attended by relief.

Visceral Neuralgia.—In persons of nervous habits, and subject to neuralgias, it is not uncommon to find a sudden attack of severe pain in certain of the viscera, such as kidney, liver, stomach, bowel, and spleen, and is referred to as neuralgia of the kidney, liver, etc.

Treatment.—In the treatment of neuralgia, much depends upon our ability to remove the underlying cause, which may be local, general, or reflex. Thus when it is local, such as a neuroma, caries, aneurism, or cicatrix, we would not expect much benefit from medication, but surgical measures would effect a cure. Where the cause was general, our attention would be directed toward improving the general health by correcting septic processes, establishing the secretions, and improving nutrition. When due to reflex causes, a careful search must be instituted for the irritant part, a correction of which is followed by relief. It may be due to uterine, ovarian, rectal, or urethral lesions, and until this is overcome, but little relief can be obtained by the administration of medicines.

An illustration of this may be seen in one of the most intractable facial neuralgias I ever encountered. The patient, aged about seventy years, had suffered for eighteen months with the most intense pain, the paroxysms occurring every few minutes day and night. He had had heroic dosing and infinitesimal medi-

cation, but, worn in body and mind, was growing worse. My first examination of the patient revealed hemorrhoids, pockets, and redundant tissue of the rectum, and a bad stricture of the urethra; the correction of which gave the patient the first relief in eighteen months.

In the most severe paroxysms, the physician may have to resort to morphia hypodermically, though it should be used at long intervals, lest the morphine habit be established.

Remedies that influence neuralgic conditions are the following:

Facial Neuralgia.—Aconite, gelsemium, plantago, passiflora, piper methysticum, and chamomilla.

Cervico-occipital and Cervico-brachial.—Aconite, macrotys, rhamnus Californica, gelsemium, and sticta pulmonaria.

Intercostal.—Bryonia, asclepias, lobelia, and macrotys.

Lumbar and Sciatic.—Macrotys, rhamnus Californica, bryonia, collinsonia, sticta, apocynum, æsculus, quebracho, and the salicylates. Antikamnia, phenacetin, and like remedies, should be used with care. Where the neuralgia shows periodicity, quinine should be administered. Counter-irritants will be found useful in many cases.

DISEASES OF THE CRANIAL NERVES.

THE OLFACTORY NERVE.

The olfactory nerve may be affected in its nasal origin, in the mucous membrane, by a disturbance at the bulb, at some point in the course of the tract, or at its origin in the brain. The result is an increased, diminished, or perverted function of the sense of smell.

Hyperosmia is an abnormally acute sense of smell, and is generally found in hysteria, neurasthenia, and insanity.

Parosmia.—Perversion of the sense of smell may be confined to one or many odors, and, like hyperosmia, occurs most frequently in neurasthenia and in the insane.

Anosmia.—Loss of the sense of smell, may be due to acute or chronic rhinitis, bone disease, or lesions of the brain.

Treatment.—The treatment depends entirely upon the cause. When due to organic changes, medication is unsatisfactory.

THE RETINA AND OPTIC NERVE.

Retina.—Hemorrhage into the retina may arise from a number of causes, thus it is found in leukemia, the pernicious anemias, purpura, and scurvy, and is often the first evidence of chronic nephritis. It may take place during parturition, though it most frequently occurs after the menopause. Vision is more or less impaired, and if the hemorrhage be superficial, an ophthalmoscopic examination reveals redness and swelling of the eye-ground, while deeper hues reveal the characteristic flame-shaped redness. White opacities are due to fatty degeneration of the retina or to extravasation of leukocytes.

Retinitis.—There are three principal forms,—(1) albuminuric, (2) syphilitic, and (3) pigmentary.

Albuminuric retinitis is found in from fifteen to twenty-five per cent of all cases of chronic nephritis, especially in the interstitial form. Not infrequently retinal changes occur before albumin is present to suggest nephritis. According to Gowers, three forms exist,—a degenerative, a hemorrhagic, and an inflammatory form. In the first, degeneration with retinal changes, there may be but slight alteration in the disk, or white patches of fatty degeneration are dotted over the fundus; in the hemorrhagic form, there may be but slight evidence of inflammation, and the hemorrhage assumes a striated or feathery aspect; in the inflammatory form, there is much swelling of the retina and obscuration of the disk.

Syphilitic Retinitis.—This form of retinitis occurs occasionally in the late stages of acquired syphilis, and is not so frequently seen as choroiditis or chorio-retinitis.

Opalescent patches are seen upon the retina, and the vitreous humor assumes a turbid condition. Failing vision is the first symptom to attract attention to this condition.

Pigmentary Retinitis.—This is usually seen in young adults and suggests inherited syphilis. Not infrequently two or more members of a family are thus afflicted. Pigmentary material is deposited along the course of the retinal arteries; as the deposit increases, there is a progressive loss of vision.

Treatment.—The general practitioner will not have many cases to treat, as the patient will consult an oculist. The few that he will treat, should be handled in the same rational manner as

characterize diseases in general; namely, meet the conditions, as far as possible, by specific remedies.

Belladonna for evidence of congestion of the retina; gelsemium where there is determination of blood to the eye, and it is in an active excited condition. Antisyphilitics when indicated, such as phytolacca, echinacea, stillingia, the iodids, and kindred remedies. Although we are not to expect too much in the curative action of internal medication, we may at least retard the progressive course of the disease.

THE OPTIC NERVE.

Disease may occur in the nerve, in the chiasm, or in the tract, and is always serious in character, suggesting tumors, syphilis, meningitis, or hemorrhages.

Optic Neuritis.

Etiology.—Optic neuritis is generally secondary, and may be regarded as a symptom of a serious cerebral disturbance. While in rare instances it may be primary, the result of cold and exposure, Gowers and Bramwell claim that eighty per cent are associated with cerebral tumors.

It sometimes occurs in the course of certain infectious fevers, notably scarlet fever, measles, enteric fever, and syphilis, and is also found in Bright's disease, leukemia, and diabetes.

Pathology.—Congestion of the disk (choked disk, papillitis), with its accompanying blurred or hazy condition, is seen in the early stage of optic neuritis; as the disease progresses the swelling increases and hemorrhages are not uncommon. If the inflammation be slight, resolution and restoration of the nerve take place, but more frequently it results in complete atrophy of the nerve. The retina may become involved, giving rise to neuroretinitis.

Symptoms.—There are no characteristic symptoms, that can be recognized, if we except an ophthalmoscopic examination, and the latter must invariably be made before we can be certain of our diagnosis.

Prognosis.—The prognosis is not very favorable, for while mild cases *may* recover, they usually terminate with partial loss of vision, and the severer cases result in total blindness.

Treatment.—Where the cause is *specific*, potassium iodid, echinacea, stillingia, phytolacca, Donovan's solution of arsenic, and kindred remedies will be given; otherwise the treatment is symptomatic.

THE MOTOR NERVES OF THE EYEBALL.

Third, Fourth, and Sixth.

Diseases belonging to the motor nerves (motor oculi, patheticus, and abducens), properly belong to ophthalmology, and need not be considered here.

The Fifth Nerve (Trifacial).

The fifth nerve is a compound nerve, being the great sensory nerve of the head and face, and the motor nerve of the muscles of mastication.

The *ophthalmic* and *superior maxillary* divisions are entirely sensory; the *inferior maxillary*, the third division, is partly sensory and partly motor.

The *ophthalmic* division supplies the eyeball, the lachrymal gland, the mucous lining of the eye and nasal fossæ, and the integument of the eyebrow, forehead, and the nose.

The *superior maxillary division* supplies the infraorbital region, the skin over the malar bone, the root of the nose, the upper lip, a large part of the nasal mucous membrane, the palate, the upper part of the pharynx, the teeth in the upper jaw, and the integument covering the temple and side of the forehead.

The *inferior maxillary division* supplies the teeth and gums of the lower jaw, the integument of the temple and external ear, the lower part of the face, and the lower lip, the tongue, and the muscles of mastication.

Lesions of the fifth nerve may be due to pontine hemorrhage or tumors of the pons, to softening or sclerosis; meningitis; injury at the base of the brain; gummata; caries of bone; or it may be due to injuries or disease of the branches after passing out, as a neuritis, or from pressure by growths.

Symptoms.—*Sensory Portion.*—In the early stage, pains of a shooting, boring, or burning character are observed, with tenderness along the course of the nerve, and certain areas where there

is hyperesthesia; this is followed later by anesthesia of the skin of the face and head, the conjunctiva, the mucosa of the tongue, lips, nose, and of the soft and hard palate. The muscles of the face become slower in their action, the sense of smell and taste are impaired, and the salivary, lachrymal, and buccal secretions are diminished.

Motor Portion: Paralysis.—The temporal and masseter muscles may be partially or entirely paralyzed, the jaw being drawn to the affected side.

Spasm of the masticatory muscles—spasm of Romberg—may be tonic or clonic. In the tonic spasms the jaws are firmly locked (locked jaw), rigid, and frequently painful.

Clonic spasms may occur as a symptom of chorea, hysteria, and sometimes in women, late in life.

Treatment.—This will depend upon the conditions present. For the sensory wrongs, when not due to organic lesions, much relief may be secured from specific *plantago major*, *gelsemium*, *mellilotus*, and *piper methysticum*. Where the pain is intense, morphia may have to be used. When due to specific causes, the iodids and similar remedies will be required.

Galvanism and Faradism will be useful in some cases.

THE SEVENTH OR FACIAL NERVE.

Synonyms.—Facial Paralysis; Bell's Palsy.

Etiology.—Paralysis of the seventh or facial nerve may be supra-nuclear, nuclear, or peripheral in origin.

Supranuclear Paralysis.—This form is due to lesions of the cortex, corona radiata, or internal capsule, and is usually associated with hemiplegia.

Tumors, cerebral softening, hemorrhage, and abscess or chronic inflammation, may be responsible for this lesion.

It differs from the peripheral form in that the upper branches of the facial nerve are intact, enabling the patient to wink and wrinkle the forehead. The normal electrical excitability of both nerves and muscles are also preserved.

The emotional movements are not so impaired in this form of paralysis as the voluntary.

Nuclear Paralysis.—This form is more rare and may be due to tumors, hemorrhages, or softening, affecting the nucleus. This

center has also been involved in diphtheria and anterior poliomyelitis.

The symptoms are those of the peripheral type.

Peripheral or Infranuclear Paralysis.—When the nerve trunk is involved within the pons, it is usually due to hemorrhage, a tumor, or softening. When affected at its point of exit, it may be due to syphilis, meningitis, tumors, or fractures at the base of the skull. Caries of the bone, or disease of the middle ear, may affect the nerve in the Fallopian tube, and at its emergence from the styloid foramen it may be influenced by pressure, as from tumors of the parotid gland, or from forceps in instrumental delivery.

Symptoms.—In facial paralysis, the appearance of the affected side presents a picture that is characteristic. The tissues are lax and immobile, the natural lines and furrows are diminished or entirely effaced, especially noticeable in elderly people, the skin of the forehead being smooth and without wrinkles. The lower lid droops, and the patient is unable to close the eye, owing to paralysis of the orbicularis palpebrarum; the eye waters, and the affected eye remains open during sleep.

Voluntary and emotional movements are lost, the corner of the mouth drops and the mouth is drawn to the affected side. In protruding the tongue it appears as though it was drawn to the affected side, but examination reveals the tongue in normal position, the distortion being due to the drawing of the mouth away from the affected side. The sagging of the mouth causes the saliva to dribble. The patient can not whistle, whisper, or lift the angle of his mouth. In drinking, the lips are not perfectly closed and the fluid is apt to escape from the mouth. Owing to paralysis of the buccinator, the food collects in the teeth and cheek of the affected side. The patient is unable to sniff, owing to paralysis of the nasal muscles.

Where the nerve is involved within the canal between the geniculate ganglion and the region of the chorda tympani, taste is lost upon the anterior two-thirds of the tongue.

There is often abnormal sensitiveness to sound, though if there has been disease of the middle ear, sensitiveness is lost or materially lessened.

Spasmodic twitching of the affected muscles may occur late in the disease.

Where the paralysis is due to cold, the facial muscles alone are involved, hearing and taste being preserved, and electrical reactions remain good. Recovery takes place in from one to four weeks.

Diagnosis.—The diagnosis is readily made by noting the characteristic picture as given above.

Prognosis.—The prognosis is generally favorable, though it may last several months. If due to traumatism, tumors, or softening, it will most likely be permanent.

Treatment.—The treatment will depend upon the cause giving rise to the lesion. If due to cerebral tumors, softening, and like causes, but little result will be obtained from medication. If the result of middle-ear diseases, thorough drainage must be secured. If due to syphilis, potassium iodid, echinacea, berberis aquifolium, corydalis formosa, thuja, and Donovan's solution will give good results.

If due to cold, gelsemium, bryonia, macrotys, rhamnus Californica, and other antirheumatics will be suggested.

Galvanism should receive a thorough trial.

THE AUDITORY NERVE.

Diseases of the auditory nerve may be due to tumors, softening, syphilis, chronic inflammation, meningitis, aneurism, otitis media, and labyrinthine disturbances. Quinine and the salicylates also affect the hearing.

Hyperacusis (hyperesthesia) is that condition when certain or all sounds are abnormally increased. It sometimes occurs in hysteria and in the course of cerebral diseases. Paralysis of the stapedius is also followed by an abnormally acute hearing.

Dysacusis, difficult hearing, may be due to any of the above-mentioned causes that affect the auditory nerve, but more frequently to middle-ear diseases.

Tinnitus aurium is that condition where abnormal sounds occur, such as ringing, crackling, buzzing, whirring, or tickling sensations, and may be due to accumulations of cerumen, labyrinthine disturbances, otitis media, anemia, aneurism, and sometimes it occurs as an aura in epilepsy. These abnormal sounds

may be more or less constant or exaggerated at night and when the system is depressed or impoverished.

Treatment.—In the treatment of diseases of the auditory nerve, a careful and patient study must be made to determine its cause, and, if possible, remove it. The general health is to be considered and placed in the best possible condition. Where due to specific causes, the antisyphilitis will be used. Galvanism should be tried. This lesion is for the specialist rather than the general practitioner, and should be referred to the aurist.

Meniere's Disease : Auditory or Labyrinthine Vertigo.

In 1861 Ménière described an aural vertigo, where the attack came on suddenly and occurred as a paroxysmal affection, the characteristic symptoms being vertigo, deafness, and tinnitus aurium.

Etiology.—The disease occurs more frequently in men than in women, and generally after the age of thirty-five. It is probably due to labyrinthine disturbances.

Pathology.—But little is known of its true pathology, and whether the lesion be in the semicircular canals or in the cerebral centers, is not known.

Symptoms.—The attack comes on suddenly, with the sensation of being struck. With the dizziness, there comes a sense of nausea, which rapidly increases, ending in vomiting of bile. In mild cases, the patient, though quite dizzy, retains consciousness, but when severe, he may fall unconscious. Deafness and tinnitus usually are present during an attack.

The attacks recur at irregular intervals, varying from a day to several months.

Prognosis.—The prognosis is uncertain, some cases recovering, while others grow progressively worse until deafness is confirmed.

Treatment.—The treatment is not very satisfactory. Charcot recommended quinine in twenty-grain doses daily, to be continued for several weeks. Gowers advises sodium silicylate in five-grain doses, while the bromids are suggested by others.

THE GLOSSOPHARYNGEAL NERVE.

The glossopharyngeal nerve is so intimately connected with the trigeminus, the facial, the pneumogastric and sympathetic nerves, that its function is not very well understood; hence very little is known as to lesions of this nerve. Difficulty in swallowing, and loss of sensation in the roof and walls of the pharynx, are most likely due to paralysis of the ninth nerve.

THE PNEUMOGASTRIC NERVE.

The pneumogastric nerve has a longer course and a wider distribution than any of the cranial nerves, being distributed to the pharynx, esophagus, larynx, lungs, heart, stomach, intestines, and spleen.

Etiology.—The nucleus may be involved by hemorrhage, softening, tumors, or by degeneration, as seen in bulbar-paralysis.

The nerve-root within the skull may be disturbed by meningitis, by morbid growths, or by aneurism of the vertebral artery.

In the neck it may be disturbed by pressure from tumors, or it may be ligated in tying the carotid artery, or injured in surgical operations or by punctured or incised wounds. Neuritis from exposure or toxemia is quite rare.

Pharyngeal Branches.—Functional disturbances of the pharyngeal branches results in spasm of the muscles and mucous membrane of the larynx, as seen in nervous individuals, and generally occurs in hysterical patients, and is known as globus hystericus.

Paralysis of the branches may follow diphtheria or accompany bulbar paralysis, and causes difficulty in swallowing, the food being inclined to enter the larynx, where it gives rise to coughing or to severe choking. If the soft palate be involved, the food is regurgitated into the nose.

Laryngeal Branches.—Functional disturbances of the laryngeal branches gives rise to spasm of the adductors—laryngismus stridulus—not infrequent in children, but rare in adults. Paralysis of the branches gives rise to stridulous respiration, cough, and hoarseness, or complete aphonia, with more or less dyspnea. It may result from diphtheria, or from pressure upon the recurrent laryngeal, from aneurisms, goitre, or morbid growths.

Pulmonary Branches.—Since the bronchial muscles are supplied by these branches, their disturbance gives rise to spasm of the intrinsic muscles, as seen in bronchial asthma.

Where paralysis occurs, respiration is slow and sometimes labored, and accompanied by cardiac disturbances.

Cardiac Branches.—The cardiac branches are motor, sensory, and trophic; hence the variety of cardiac phenomena displayed by disturbance of these branches.

Irritation of the *motor* branches slows the action of the heart—bradycardia—and may be due to a pure neurosis or to compression from tumors.

Paralysis of the vagus abolishes inhibitory action, when the accelerators are unrestrained, and the heart fairly runs away—*tachycardia*. This may follow diphtheria, wounds, accidental ligature of the nerve, or pressure from growths.

When the *sensory* branches are disturbed, palpitation and pain are experienced, as witnessed in angina and other painful cardiac affections.

Trophic disturbance is seen in fatty degeneration of the heart, following injury to the vagus.

Esophageal Branches.—Functional disturbances occur more frequently than paralysis; spasm of the esophagus, occurring in hysterical patients, is attended by difficulty in swallowing. Paralysis of the esophagus results in difficulty in swallowing.

Gastric Branches.—These are both motor and sensory. A disturbance of the sensory branches gives rise to pain, as seen in nervous dyspepsia and other gastric disturbances. Hunger is probably a pneumogastric sensation.

A section, or paralysis of the nerve, lessens the contractile power of the stomach, though does not destroy it entirely. The vomiting occurring in cerebral disturbances is most likely due to irritation of these branches.

Irritation of the intestinal branches accelerates the action of the intestines, though intestinal disturbances from lesions of the vagus are so rare that little has been learned regarding them.

Treatment.—The treatment must be symptomatic. When due to specific causes, the antisiphilitics will be used. Electricity and massage should be tried in other cases. Where the lesion is functional, spasm resulting, the antispasmodics will be given, such as gelsemium, lobelia, the bromids, chloral, and like remedies.

THE SPINAL ACCESSORY NERVE.

The spinal accessory nerve consists of two parts, an internal or accessory portion, and an external or spinal portion.

The accessory part forms the motor portion of the pneumogastric and is distributed to the pharyngeal and laryngeal muscles, lesions of which have been considered in lesions of the vagus.

Lesions of the spinal part may result in spasm or paralysis. Torticollis—wry neck—may be congenital, fixed wry-neck, or spasmodic, acquired torticollis. This may be due to injury at birth, or to some abnormal intra-uterine condition, and results in shortening and atrophy of the sterno-mastoid muscle. The right side is almost exclusively affected. The development of the face on the affected side is slower than that of its fellow, hence facial asymmetry results.

The symptoms are not usually noticed for several months, owing to shortness of the baby's neck.

Treatment.—This is surgical, tenectomy relieving the deformity.

Spasmodic Wry-neck.—This form may be either clonic or tonic or a combination of the two. Males are more frequently affected than females, and it usually occurs between the ages of thirty and fifty. When it occurs in females, it is usually found in those of a hysterical nature and under thirty years of age. There is generally a neurotic family history. Cold may be an exciting cause, especially in persons inclined to rheumatism.

Symptoms.—While spasm may be the first symptom, it is often preceded by a sharp neuralgic pain or one of a dull character, or it may be that a sense of stiffness is the first premonitory warning. The spasm often comes on gradually, involving the sterno-mastoid alone, or it may include the trapezius.

The occiput is rotated toward the shoulder of the affected side, while the chin is elevated and the face turned to the sound side. The facial nerve, as well as the brachial plexus, may become involved, giving rise to a combined spasm of the muscles supplied.

The spasm is usually in abeyance during sleep. Clonic spasms are apt to be more painful than tonic spasms, the latter exhibiting more fatigue of the muscles than actual pain.

Prognosis.—The disease is apt to be chronic, though, after

months or years, it may cease to progress, and improvement begin. If recovery takes place, recurrences are frequent.

Treatment.—Where functional, the antispasmodics and anti-rheumatics should be given a thorough trial. Such remedies as gelsemium, passiflora, scutellaria, plantago major, hyoscyamus, and the bromids of the former class, and macrotys, bryonia, and rhamnus Californica of the latter. Where pain is intense, a hypodermic of morphia may be necessary to overcome the spasm and relieve the pain. Galvanism is sometimes useful, and nerve-stretching has afforded relief in some cases.

Paralysis of the Spinal Accessory Nerve.—The same causes may be active in affecting the muscles and nerve-trunk that were seen in lesions of the pneumogastric; namely, degenerations, morbid growths, meningitis, or toxemia.

In paralysis of the spinal portion there is atrophy of the sterno-mastoid on the affected side, impairing the power of rotating the head toward the opposite side, and partial paralysis of the trapezius, which interferes with lifting the arm. The shoulder drops, and the supra-clavicular depression is increased.

Where there is bilateral paralysis of the sterno-mastoid with atrophy, the head falls backward, but if the trapezii are affected the head falls forward.

Treatment.—The cause must be carefully sought for, and, when a removal is possible, a cure may be effected. If the lesion be nuclear, but little may be expected from medication.

Where due to pressure, surgery may afford relief. Electricity promises well in some cases.

THE HYPOGLOSSAL NERVE.

The hypoglossal nerve is the motor nerve of the tongue, and, like the preceding nerves, is affected by degenerative changes, injury, meningitis, tumors, syphilis, and toxemia.

Nuclear lesions, usually bilateral, are frequently associated with locomotor ataxia; cortical lesions with hemiplegia. Spasm or paralysis may attend disease of this nerve.

Spasm.—Spasm of the tongue may result from reflex irritation of the fifth nerve, or it may be a part of a general spasm, such as epilepsy or chorea. It sometimes occurs in hysteria and

in some forms of stuttering. A rare and peculiar form of clonic spasm is where the tongue is thrust in and out with great rapidity.

Paralysis.—When a complete bilateral paralysis occurs, the tongue lies motionless on the floor of the mouth, and speech, mastication, and deglutition are difficult, but taste and touch are not impaired.

When the paralysis is unilateral, the tongue deviates to the affected side when protruded, unless the lesion is within the medulla, when it turns toward the sound side.

Prognosis.—It is generally unfavorable.

Treatment.—This is symptomatic, and consists of removing the causes, where possible, and building up the general health. The judicious use of tonics and alteratives and the indicated remedy will form the wisest form of medication. Electricity will deserve a trial.

II. DISEASES OF THE SPINAL CORD.

DISEASES OF THE SPINAL DURA MATER.

PACHYMENINGITIS.

Definition.—Pachymeningitis is an inflammation of the outer or inner surface of the dura mater (*pachymeningitis externa or interna*).

Pachymeningitis externa is more of a primary lesion, it always being the result of pressure from morbid growths, caries of the vertebra, or syphilitic deposits. It may be acute or chronic.

In the *acute form*, the inflammation is generally fibrino-purulent, the symptoms being those of compression-myelitis. The *chronic form* is generally due to tuberculosis of the vertebrae. (Pott's disease.) The external layer is rough, thickened, and covered with a cheesy material.

Symptoms.—There may be hyperesthesia and motor spasms, to be followed later by anesthesia, paralysis, atrophy of the muscles, and loss of reflexes—Pachymeningitis interna. Hypertrophica or cervicalis hypertrophica, is of an obscure origin. It was first described by Charcot in 1871. It is generally limited to the cervical region. The dura mater is much thickened, which destroys the nerve-roots and causes compression of the cord.

In the early stages of the disease neuralgic pains are experienced in the occipital region and in the upper extremities. There may be hyperesthesia, and sometimes a herpetic eruption is present. As the disease progresses, compression of the cord increases, which results in atrophic paralysis, and which gives rise to hand deformity—claw-hand.

Prognosis.—The disease is progressive and terminates in death.

Treatment.—The treatment recommended, the iodids and electricity, has not been attended with very satisfactory results.

DISEASES OF THE SPINAL PIA MATER.

ACUTE LEPTOMENINGITIS.

Synonym.—Acute Spinal Meningitis.

Definition.—Leptomeningitis is an inflammation of the pia mater, and may be acute or chronic.

Etiology.—The exciting cause is not positively known, though it is now generally accepted as being due to infection from pyogenic cocci, the most frequently seen being the pneumo-coccus, the meningococcus following next.

Exposure to wet and cold, as well as direct or indirect injury to the spinal column, such as fractures, wounds, or surgical operations has been followed by meningitis, though these may have been only preparatory means for the entrance of the infecting bacteria.

It is often associated with tuberculosis and the infectious fevers, particularly croupous pneumonia, typhoid fever, scarlet fever, diphtheria, pyemia, and septicemia. It may also be due to an extension of inflammation of the meninges of the brain.

Pathology.—The changes in the membranes of the cord are those peculiar to inflammation. First, hyperemia, which may be diffused throughout the length of the cord or localized. This is followed by an exudation of fibrinous material containing red blood-corpuscles and leukocytes, which later changes to pus. The nerve-roots may also be involved. Owing to the dorsal position assumed, the exudate is more profuse on the posterior por-

tions of the pia mater, due to gravitation. Similar lesions are found in the cerebral meninges, in the majority of cases.

Symptoms.—The disease generally begins with a well-marked chill followed by febrile reaction, which early may assume a septic type. Where the cerebral meninges are involved, the early symptoms, flushed face, bright eyes, contracted pupils, and restless condition, may for a time obscure the main lesion. Soon, however, the intense pain in the cervical region, the marked hyperesthesia, and the tonic or clonic spasm of the muscles drawing the head backwards, removes all doubt as to the seat of the lesion.

There is marked tenderness along the spine, and when the spasms are intense there may be opisthotonos. There may be retention of urine, due to reflex spasm of the bladder. The reflexes are all exaggerated.

As the acute inflammation subsides, anesthesia replaces the hyperesthesia, paralysis follows, and the reflexes disappear.

Diagnosis.—The diagnosis should not be difficult. The tenderness along the cervical region, the intense pain in the back, radiating to the upper and lower extremities, retraction of the head, hyperesthesia, rigidity of the muscles, and fever of a septic type, can not be mistaken for any other lesion.

Prognosis.—This is a grave lesion, and the prognosis must be guarded. Death may result in forty-eight hours, or be prolonged for two or three weeks.

Treatment.—Aconite in the small dose, and gelsemium and echinacea in full doses, will form a good treatment, thus:

R	Spec. Aconite.....	gtt. v.	
	Spec. Echinacea.....	ʒii.	
	Spec. Gelsemium.....	ʒss.	
	Water	ʒiv.	M.
	Sig. Teaspoonful every hour.		

Rhus tox., macrotys, and bryonia should be given as may be indicated, and the sulphites, chlorates, and mineral acids where sepsis indicates their use. Great care must be exercised during convalescence, that the patient avoid everything that tends to excitation.

CHRONIC LEPTOMENINGITIS.

Synonym.—Chronic Spinal Meningitis.

Definition.—Chronic leptomeningitis is a chronic inflammation of the meninges of the cord.

Etiology.—This may follow the acute form, though generally the result of syphilis, alcoholism, and disease of adjacent bone, which may be tubercular carcinomatous, or sarcomatous. It may be the result of concussion of the spine.

Pathology.—The pia mater is injected, swollen, edematous, and infiltrated with cells. Adhesion of the pia mater and the dura mater often occurs, or they may be welded together. The ventricles may contain serum, and the ependyma lining them, is frequently thickened. There may be hemorrhages into the membrane.

Symptoms.—The symptoms are not well defined, and are those of slow compression. In some cases they are negative, while in others, where the nerve-roots are involved, there will be hyperesthesia, radiating pains, stiffness, tremors, and sometimes paralysis. The symptoms are progressive and may extend over years.

Prognosis.—Although the disease is not rapid, it generally terminates in death.

Treatment.—Diet, hygienic measures, and remedies that improve the general health are to be considered in the treatment. Open air and an equable climate and easily digested food should be recommended.

HEMORRHAGE INTO THE SPINAL MEMBRANE.

Synonyms.—Meningeal Apoplexy; Hematorrachis.

Definition.—Extrameningeal hemorrhage is where the blood is between the dura mater and the spinal canal. Intrameningeal hemorrhage, is where the bleeding takes place between the dura mater and the pia mater.

Etiology.—Most meningeal hemorrhages are due to violence, resulting in injuries, as from blows or falls. The rupture of an aneurism is sometimes responsible for this condition. Cancer may give rise to hemorrhage by erosion of the blood-vessels. Dis-

eases attended by severe convulsion have also figured as causal factors. It may occur as a complication of any of the infectious fevers. Cerebral hemorrhage may result in extravasation of blood into the membranes of the cord. Males are more apt to suffer than females, no doubt, owing to greater exposure.

Pathology.—The peridural space accommodates quite a large amount of blood without resulting in pressure, hence large hemorrhages are found in the extrameningeal form.

In the intrameningeal form, the hemorrhages are small and scattered.

Symptoms.—If the hemorrhage be small the symptoms are negative, but if large enough to produce pressure, are apoplectic-form in character although consciousness is retained.

The first effect is irritation and hyperesthesia, muscular irritability, radiating neuralgic pains, and herpes follow. Later, however, the pain ceases, and anesthesia and paralysis follow. The bladder and rectum may share in the lesion, incontinence being the distressing feature. Where the hemorrhage is high, respiration is involved.

Diagnosis.—This is generally difficult, a positive diagnosis being seldom made.

Prognosis.—This depends largely upon the amount of the hemorrhage and the causes giving rise to it. If the hemorrhage be small and the general health good, absorption rapidly takes place, with complete recovery.

Treatment.—The treatment will be that used for hemorrhage of any part or organ. Rest in bed, cold applications, and the internal administration of gallic acid, ergot, the oils of cinnamon and erigeon, mangifica indica, and others of like character. Massage, electricity, and the iodids will be used to promote absorption.

HEMORRHAGE INTO THE SPINAL CORD.

Synonyms.—Spinal Apoplexy; Hematomyelia.

Definition.—A hemorrhage directly into the substance of the cord.

Etiology.—Spinal apoplexy may be due to traumatism, to changes in the coats of the blood-vessels, or to excessive blood-pressure.

Pathology.—The clot may be as large as an almond, seldom larger, the appearance of which depends upon its age; if recent, it will be red or dark in color, and changes to brown or yellow with age; still later it may become encapsuled by a fibrous deposit. There may be gliomatous tumors or acute myelitis.

Symptoms.—The symptoms depend somewhat upon the seat of the lesion and the extent of the hemorrhage. Where the hemorrhage is large, severe shooting pains occur in the back and

FIGURE 37. SECTION OF A NORMAL SPINAL CORD, IN THE CERVICAL REGION.—(*After Gowers.*)—(*Tyson.*)

A. C. Anterior Commissure. P. C. Posterior Commissure. I. g. s. Intermediary gray substance, the gray matter between the two horns. P. cor. Posterior Cornu. C. C. p. Caput Cornu posterioris. L. L. L. Lateral limiting layer. A. L. A. T. Anterio-lateral ascending tract of Gowers, which extends along the periphery of the cord.

limbs, with muscular twitchings, cramps, and rigidity. Usually the pain in the back is severe, subsiding within twenty-four hours. Paraplegia is sudden, with loss of sensation and the reflexes, and not infrequently loss of control of the bladder and bowels.

Unless the lesion is near the medulla, consciousness is retained. A slight fever may follow after twenty-four or forty-eight hours.

The type of paralysis may be monoplegia, hemiplegia, or paraplegia. Disturbance of the sensory functions may give rise to hyperesthesia, anesthesia, paresthesia, etc.

Diagnosis.—The diagnosis is always difficult, the difference between the symptoms of hematomyelia and hematorrachis being so slight as to render a positive diagnosis almost impossible.

Prognosis.—This depends upon the extent and location of the clot. Thus hemorrhage into the dorsal segments is less serious than in the cervical or lumbar segments, respiration being disturbed in the former through interference with the phrenic nerve, and the vesical and rectal sphincters in the latter.

If the hemorrhage be small in quantity, absorption may speedily take place with complete recovery. The rapid development of bed-sores is an unfavorable symptom.

Treatment.—The same line of treatment as used in spinal-meningeal hemorrhage, can be carried out in this lesion.

ACUTE MYELITIS.

Synonyms.—Myelitis; Acute Diffuse Myelitis; Transverse Myelitis; Spinal Malacia.

Definition.—An acute inflammation of the spinal cord, extending transversely or longitudinally, and attended by softening or sclerosis of the cord.

Etiology.—The disease occurs more frequently in men than in women, probably due to greater exposure of the former. Exposure to wet and cold, especially in alcoholics, may be followed by myelitis, and it frequently follows the infectious fevers, especially small-pox, typhus fever, and measles. Traumatism of the spine, caries of the bones, great emotional excitement, and certain mineral poisons, especially lead, arsenic, mercury, and phosphorus, may induce it. Gout, rheumatism, and syphilis not infrequently precede myelitis, though syphilis is more apt to give rise to the chronic form.

Pathology.—The lesion is most frequently found in the upper dorsal region, next in the cervical, and rarely in the lumbar region.

The disease may be limited to a small vertical area extending entirely across the cord—*transverse myelitis*—or a large portion may be affected—*diffuse myelitis*; again several areas may be involved in different parts of the cord, when it is termed *dissemi-*

nated myelitis, and is known as *central myelitis* when only the gray matter is involved.

Upon ocular inspection the cord may present no visible changes, or it may show extreme softening, almost diffuent, or it may be sclerotic, owing to proliferation of interstitial connective tissue.

The cord may be swollen, and red, gray, or yellow in color, according to the amount of blood, connective tissue, or fat contained.

Symptoms.—The symptoms will naturally depend upon the location and extent of the lesion. The most frequent seat of election is the dorsal region, and transverse myelitis is the most common type.

The attack may resemble the first stage of rheumatic fever, beginning with a well-marked chill, rapidly followed by febrile reaction; there is headache, backache with general muscular soreness, nausea, vomiting, and sometimes convulsions. In a few days, however, the spinal symptoms appear, paralysis of motion with complete loss of sensation below the site of the lesion, rapidly develop, incontinence of the sphincters of the bladder and rectum follow, and bed-sores over the sacrum and hips appear.

When the cervical region is involved, the onset may occur suddenly, as noted in the dorsal region, or the attack comes on more insidiously. The upper extremities are now involved, and respiration is disturbed. If very high up, death early ensues owing to failure of respiration.

The sensory symptoms are at first a tingling, crawling, or burning sensation, to be followed shortly by entire loss of sensation. The reflexes may be permanently lost, or they may return in an exaggerated form. Superficial ulceration occurs most frequently when the lumbar region is involved. The course of the disease depends upon the extent and cause of the disease.

Complications and Sequelæ.—Cystitis occurs as the most frequent complication, and is usually due to retention of urine. Pulmonary and renal complications are common, and amyloid degeneration of the kidneys is sometimes found.

Diagnosis.—The sudden onset of the disease, with early development of paraplegia, paralysis of the sphincters, loss of sensation, absence of muscular pains, and the rapid trophic changes, make the diagnosis comparatively easy.

Prognosis.—Since secondary changes are very likely to occur in the cord, *complete* recovery is rare, more or less paraplegia remaining. Where trophic changes are marked, the outlook is unfavorable, and, in some severe, acute cases, death may take place in three or four days. Prolonged high temperature is also unfavorable. When syphilis is responsible for the lesion, the prognosis is more favorable.

Treatment.—In the acute state, treatment will be the same as that for acute meningitis; namely, aconite and gelsemium for the febrile condition and irritation of the cord. Rhus tox. will also be found useful, the indications being the same as for other lesions; namely, *sharp stroke* of the pulse, starting in the sleep, and general restlessness.

For severe sacral or lumbar pains, with muscular twitchings, full doses of gelsemium with rhamnus Californica or macrotys should be given, thus:

℞ Gelsemium.
 Rhamnus Cal.
 Macrotys aa ʒi.
 Water ʒiv. M.
 Sig. Teaspoonful every hour.

Owing to the tendency to trophic changes, care must be taken to allow no local applications to be made along the spine, after the acute stage has passed, that would tend to injury of the skin. In fact, even in the acute stage, local measures should be confined to soothing measures rather than irritants. The bladder should be catheterized at regular intervals where there is loss of control of the sphincters. Care should be taken to have the catheter aseptic.

After the acute stage has subsided, massage, electricity, and a general tonic treatment will be found useful. Strychnia, iron, and the hypophosphites, or the old Aitkin Comp. tonic mixture—the triple phosphate of iron, quinia, and strychnia—can be used with advantage.

Specific belladonna must not be overlooked, where there is capillary congestion of the cord. It will be given in the usual small dose, ten drops to four ounces of water, a teaspoonful every one, two, or three hours.

CHRONIC MYELITIS.

Etiology.—Chronic myelitis may follow the termination of an acute attack, or it may be due to trauma, hemorrhage, tumors, or caries of the vertebra.

The disease may come on insidiously, the result of syphilis or from the toxin of some of the infectious fevers. In rare cases, it may be due to cold from exposure.

Pathology.—While it may be confined to a single focus, the lesions are most often disseminated or diffuse. Sclerosis is the most pronounced lesion, even the membranes, in some cases, sharing in the sclerosis. The ascending and descending tracts may be involved in the same process. The blood-vessels are thickened; hence there is an absence of recent hemorrhage. The pia may be thickened and adherent. The nerve-cells in the gray matter become atrophied or they may entirely disappear.

Symptoms.—The symptoms are about the same as in the acute form, save the fact that they come on more insidiously, and are not so well defined, several months elapsing before sufficiently pronounced to consult a physician.

There may be perverted sensation, such as numbness, tingling, crawling, etc., though complete loss of sensation is rare.

The motor symptoms are gradual in their onset, and irregular in their development, especially where the lesion is disseminated or diffuse. The patient notices a weakness in a part, as the hand or arm, which is followed soon by impaired sensation; then a foot or leg develops weakness, to be followed by disturbed sensation, and finally paralysis.

Where there is transverse myelitis of the lumbar or sacral region, there is paresis of the lower extremities, with involvement of the sphincters. Atrophy of the muscles is more pronounced, when the lesion is of the cervical or dorsal region. The degree of trophic changes depends upon destruction of the cells in the anterior horn of the spinal cord.

Diagnosis.—The diagnosis is not always readily made, though when the symptoms enumerated are well defined, there should be little difficulty.

Prognosis.—The disease has progressed to such an extent that degenerative changes have generally taken place before the physician is consulted; hence the prognosis is necessarily grave, though

recovery may possibly take place in rare cases. The disease, however, may extend over a period of years before it terminates fatally by exhaustion.

Treatment.—In the early stages, rest in bed, associated with sponge-baths and massage, is very beneficial. As the disease becomes more chronic, our attention will be directed to maintaining as good a condition of the general health as possible. With the elaboration of a good blood, degenerative changes are stayed, and all the symptoms modified. To accomplish this end, hygienic and dietetic methods will be important adjuncts to the treatment. Change of air and climate, having the patient much in the open air, is very desirable.

Digestion will be improved by the bitter tonics, and secretion from the skin, kidneys, and bowels should be encouraged. For the motor disturbances, physostigma in from one to three drop doses is recommended by Goss. Phosphide of zinc in one-tenth grain doses three or four times a day has also been used. Electricity will have its place, though too much dependence must not be placed upon remedies or methods.

ANTERIOR POLIOMYELITIS.

Synonyms.—Atrophic Spinal Paralysis; Infantile Spinal Paralysis.

Definition.—Anterior poliomyelitis is an inflammation of the anterior horn, occurring most frequently in children under three or four years of age, though occasionally found in adults, and characterized by paralysis of one or more of the extremities, followed by atrophy of the muscles, but without loss of sensation.

Etiology.—The exciting cause is unknown; it usually occurs in children under three or four years of age, sex having no influence. Dentition, cold, injuries, mental or physical exertion, menstrual suppression, sexual excesses, syphilis, and various dissipations have been regarded by various writers as possible causes, though, most likely, the only influence they exert is predisposing, by lowering the vitality. It occurs most frequently during the summer months.

It may be epidemic in character, Dr. Caverly reporting one hundred and twenty-six cases in Otter Creek Valley, Vermont,

during the summer of 1894. Other epidemics have been reported in Norway, Sweden, and in various parts of Europe and America. These epidemics suggest the lesion to be the result of micro-organisms.

Pathology.—The chief lesion is an acute hemorrhagic focal myelitis in the cervical or lumbar enlargement, and is generally unilateral. There is congestion, followed by degeneration of

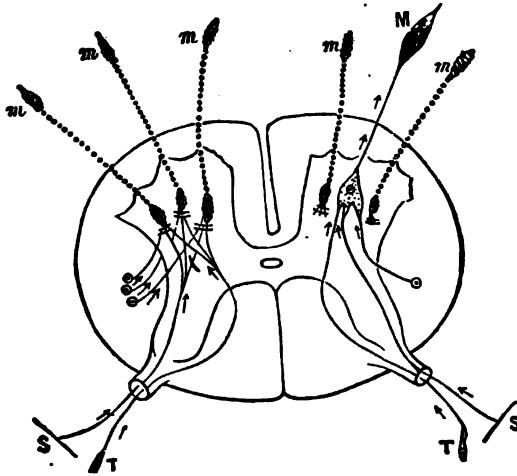


FIG. 38. Diagrammatic representation of the symptoms that result from acute destruction of the anterior cornua of the spinal cord. (*Bramwell.*) On the left side the destruction of the nerve-cells is complete; the anterior nerve-roots, motor nerve-fibres, and the muscles which they supply are all degenerated; there is a total "block" to the passage of voluntary motor and reflex motor impulses. On the right side two-thirds of the motor cells are destroyed; two-thirds of the muscular area connected with the right anterior cornu are degenerated and atrophied: one-third (M) remains healthy, and can be made to contract by voluntary or reflex motor impulses. (*Lockwood.*)

the motor cells of the anterior horn. During the early stage, there is infiltration of leukocytes, blood-cells, and small round cells, into the gray matter about the motor cells. This is followed later by a growth of sclerotic tissue. Since the anterior motor cells preside over the nutrition of the anterior nerves and the muscles of which they are distributed, granular or fatty degeneration and atrophy of the nerve and muscles follow the destruction of the motor cells, and, as a result, the affected limb or part has an im-

perfect growth, becomes cyanotic, and frequently has a lower temperature.

Symptoms.—The disease generally begins abruptly with chills and convulsions, followed by fever, the temperature reaching 102° and 103°. There may be pain in the head, back, and limbs, twitching of the muscles, vomiting, and diarrhea.

In twenty-four or forty-eight hours, paralysis appears, the

FIG. 39. POLIOMYELITIS ANTERIOR (ACUTE) FOLLOWED BY EXTENSIVE ATROPHY, CHIEFLY OF THE RIGHT SIDE. (Ranney.)

location of which depends upon the situation of the lesion. The legs are more frequently affected than the arms, about four to one. The type is generally paraplegic.

In some cases the child goes to bed in his usual good health, to awaken in the morning with paralysis. The paralysis reaches its fullest extent the first week, remains stationary from two to eight or ten weeks, when improvement begins, the last muscle affected being the first to show improvement. In a few weeks,

however, what seemed an encouraging condition, ceases, and permanent paralysis results.

The muscles of the paralyzed limb soon atrophy, the circulation is impaired, the limb becomes cold, blue, and the muscles flabby. As a result of impaired nutrition in the bone, permanent shortening of the limb occurs. The reflexes, both superficial and deep, are lost.

Diagnosis.—The diagnosis, after the first few days, is not difficult, the inability to use the affected limb, together with atrophy of the muscles, renders the diagnosis plain.

Prognosis.—The prognosis is favorable as to life, and though some improvement always takes place, permanent paralysis in arm or leg generally remains. When the muscles respond early in the disease to the faradic current, recovery is likely to take place. The prognosis is more favorable where the disease begins as an acute fever, than where it comes on suddenly during the night, the child having been previously in good health.

Treatment.—In the acute febrile stage, the special sedatives, frequent sponging of the patient, and absolute rest in bed, will give the best results. Later such hygienic and dietetic measures as will best improve the general condition should be carried out.

Nux vomica and strychnia will be useful after the acute symptoms have subsided. Ergot has been recommended in the early stage of paralysis.

The affected parts should be carefully massaged two or three times a day, and the faradic current applied daily to such muscles as respond, and the galvanic current to the paralyzed group.

Orthopedic appliances may assist materially in deformities of the limbs.

ACUTE ASCENDING PARALYSIS.

Synonym.—Landry's Paralysis.

Definition.—An acute paralysis beginning in the lower extremities, and extending rapidly upward to the trunk and to the upper extremities, neck, and face, and finally involving the medulla. Its course is rapid and generally terminates fatally.

Etiology.—The disease occurs more often in men than in women, and between the ages of twenty and thirty. The disease

is of unknown origin, and while it has followed cold, malaria, syphilis, and other infectious diseases, it is more likely a coincidence than a result.

Pathology.—There are no characteristic pathological changes found. In some cases an interstitial neuritis has been found, while in others the lesion has been that of myelitis. While the microscope fails to reveal any morbid changes in many cases, in others there is softening and extravasation of blood into the gray substance.

Symptoms.—The first evidence of the disease is a sense of weakness in the lower extremities which soon develops into paralysis. Beginning in the toes, it rapidly extends up the legs and thighs to the muscles of the trunk, arms, and neck, involving respiration, deglutition, and articulation. The muscles do not waste, electrical reactions are maintained, though the reflexes are lost.

The bladder and rectum are not involved, and bed-sores are rarely developed. There may be paresthesia, though sensory symptoms are not constant. The disease may terminate fatally in forty-eight hours, or be postponed for one or two weeks.

Diagnosis.—Weakness of the limbs, rapidly followed by paralysis, beginning in the feet and rapidly ascending to the trunk, neck, and face; impaired respiration, relaxation of muscles, with but little atrophy; loss of the reflexes; absence of electric changes, and absence of sensory symptoms, make the diagnosis comparatively easy.

Prognosis.—Recovery occurs only in rare cases.

Treatment.—The treatment will be symptomatic, and similar to that for any acute disease of the cord.

When following an infectious disease, the antiseptics might be given with benefit, notably echinacea.

After the acute symptoms subside, electricity and massage should be tried.

LOCOMOTOR ATAXIA.

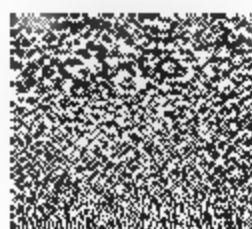
Synonyms.—*Tabes Dorsalis*; *Posterior Sclerosis*.

Definition.—A chronic disease characterized by degeneration and sclerosis of the afferent tract and posterior columns of the

cord, and which results in muscular inco-ordination, sensory and trophic disturbances, loss of knee-jerk, and the Argyle-Robertson pupil.

Etiology.—The predisposing causes are age, sex, and race. The disease is rarely seen under twenty-five years of age, being most common between the ages of thirty and forty, and more frequently in men than in women, the ratio being about ten to one. It is much more common in white races than in the colored, and Jews are less seldom affected than Gentiles.

Syphilis bears a very important relation to tabes and is undoubtedly the most important of all predisposing causes. There is a history of syphilis in from seventy-five to ninety per cent of all tabetic cases. Thus Erb reports that eighty-nine per cent of three hundred cases in private practice, had a history of syphilis, while Möbius believes that tabes *never exists* without syphilis.



CERVICAL.

DORSAL.

LUMBAR.

FIG. 40. POSITION OF LESIONS OF LOCOMOTOR ATAXIA IN DIFFERENT PARTS OF THE SPINAL CORD. (Taylor.)

Among the more common exciting causes may be mentioned sexual excesses, great physical exertion, and exposure to wet and cold. It is more common in cities than in the country.

Pathology.—The basal or pathological lesion underlying tabes is a parenchymatous degeneration, resulting in sclerosis, and involving principally the sensory neurons, though the peripheral motor neurons are also not infrequently affected; in fact, although the principal lesion is in the posterior columns of the spinal cord, tabes may be said to be degenerative conditions affecting various parts of the entire nervous system. These degenerative changes begin in the posterior root-zones, advance into the tract of Lissaur and the columns of Burdach, Clark, and Goll, connective tissues ultimately largely replacing the nerve-fiber, the contraction of which causes compression of the cord. There may also be cerebral and medullary changes, as well as changes in

the cranial nerves and their nuclei, and the peripheral nerves in the extremities. Blindness may result from gray degeneration of the optic nerve.

In some cases, trophic changes are seen in the bones, especially their articular surfaces.

Symptoms.—It is customary to divide the symptoms into three stages, though in some cases it is hard to separate the one from the other. They are the preataxic, the ataxic, and the paralytic.

I. **THE PREATAXIC STAGE.**—Although all tabetic cases do not begin in the same way, the most frequent and characteristic symptoms are as follows:

Pains.—Pains of lightning like character occur in ninety per cent of the cases, and are sharp, stabbing, piercing, or cutting in character; they are usually in the lower extremities, though they may occur in the upper extremities, the face, stomach, or rectum.

They last only for a second or two and may be associated with a burning sensation. Occasionally herpes develops at the seat of pain. These attacks occur irregularly, and are apt to follow excesses, cold, and damp weather. In a few cases pain is absent.

Paresthesia.—Perverted sensation is often experienced; the patient complains of a numb or tingling sensation in the legs or feet, or an absence of normal sensation in the feet makes the patient feel as though walking on air-cushions or cotton.

The girdle pain, or sense of constriction about some part of the trunk, is not uncommon.

Loss of Knee-jerk (Westphal's Symptom).—This early and important symptom usually comes on gradually, and when associated with ocular symptoms and the lightning pains, is positively diagnostic.

Ocular Symptoms.—These may appear very early in the disease, such as atrophy of the optic nerve resulting in impaired vision and frequently in blindness; ptosis—drooping of the eyelid; diplopia—double vision; the Argyll-Robertson pupil, a failure to contract to light, but contracts to accommodation, and the small contracted pupils, "pin points," spinal myosis.

Bladder Symptoms.—In some cases the earliest symptom noted is difficulty in emptying the bladder, the desire to micturate being frequent but unsatisfactory; as a result, there is a partial retention of urine, often resulting in cystitis. Incontinence of

urine appears late in the disease. Loss of sexual desire and impotency not infrequently appears in the early stage.

2. ATAXIC STAGE.—The symptoms of the preataxic stage persist, though new symptoms appear. The lightning-like pains, however, tend to become less severe and recur at longer intervals. The *ataxic symptoms*, the inco-ordination of movement or loss of the muscle sense, is characteristic. The symptoms are first noticed in walking or standing. Thus, if while standing the patient closes his eyes, he can not maintain the erect position without swaying, or if he places the feet close together and closes the eyes, he is in danger of toppling over. (Romberg's Symptom.) In walking, the body is bent slightly forward, the legs are farther apart than normal, and he lifts the advancing foot, throws it outward and forward with a jerk, and brings it down with a slap or stamp. The patient depends for assistance upon a cane, and, later, needs one in each hand. When sitting or lying the patient can not place his heel upon his knee or describe a circle with his foot.

The inco-ordination may extend to the upper extremities, and is recognized by inability of the patient to execute the finer movements of the hands; this is first noticed in dressing, the patient laboring awkwardly in buttoning the collar or other clothing, or in attempting to pick up a pin or other small objects. If asked to touch his nose or ear quickly, especially with the eyes shut, or to bring the tips of the fingers together, he finds it impossible.

Sensory Symptoms.—In addition to the pains already described, areas of hyperesthesia or anesthesia appear, especially in the lower extremities.

Visceral crises are characterized by paroxysmal pains in the stomach, larynx, kidney, heart, bladder, rectum, and genitals. The gastric and laryngeal being the most common.

A gastric crisis, the most frequent, consists of paroxysms of pain and vomiting, with hyperacidity. Hematemesis may also occur. Paroxysmal pains occur in the other viscera above named.

Trophic Changes.—Of these changes, the most serious are the joint lesions, and are known as Charcot's joints. The knees are the most often affected, and resemble those of arthritis deformans. Serous effusion rapidly takes place, the ligaments soften, the articular ends of the bones become absorbed, and dislocations or fractures sometimes follow. Suppuration of the joint may oc-

cur. Herpes, local sweating, and perforating ulcers may also occur. A favorite location for an ulcer is on the foot back of the big toe, on the heel, and in the rectum. Loss of the nails and hair may occur. Atrophy of the muscles does not occur till late in the disease.

3. PARALYTIC STAGE.—This is the culmination of the second stage. The patient is unable to walk, and is confined to his bed or chair. There is a loss of control of the sphincters of the bladder and rectum, the muscles waste, bed-sores are present, and in some cases the patient is blind and deaf.

Diagnosis.—The diagnosis is not difficult, no other lesion having so many characteristic symptoms, assimilating tabes. Thus, the loss of the knee-jerk, the inco-ordination as shown in the walk, the lightning-like pains, the various crises, and the Argyll-Robertson pupil, make a group of symptoms that can not be mistaken.

Prognosis and Course.—After the disease has become well established and the cord becomes sclerotic, recovery is not to be expected. The disease, however, is slowly progressive, and the patient may live for years, dying of some intercurrent affection, as pneumonia, tuberculosis, etc. The preataxic stage may last for several years, especially if atrophy of the optic nerve occurs; the stage of ataxia in such cases being postponed indefinitely, or, if present, the further course may be arrested. The disease runs from ten to thirty years, though, in rare cases, it lasts but a few months or years.

Treatment.—The treatment for tabes has not been attended with very great success. Rest in bed in the early stage when the pains are intense is to be advised, and antikamnia, phenacetin, and in extreme cases morphia, are to be used to allay the pain. The antisyphilitics have not resulted in much benefit. Hygienic measures that tend to improve the general health, with outdoor life in an equable climate, give the best results. Massage and electricity are of some benefit. When the stage of loss of control of the bladder is reached, the patient should be instructed in the use of the catheter, and the means of keeping the instrument aseptic.

Echinacea may be tried as an agent to arrest degenerative processes.

Hydrastis, avena, phosphoric acid, camphor, chlorid of gold and sodium may be thoroughly tested according to the conditions presenting.

The diet should be generous and nutritious, as much food being allowed as can be digested.

HEREDITARY ATAXIA.

Synonym.—Friedreich's Disease.

Definition.—A hereditary disease, appearing between the third and fifteenth years, and characterized by ataxia, impaired speech, nystagmus or paraplegia, and accompanied by changes in the lateral and posterior columns of the spinal cord. Friedreich first described the disease in 1861.



CERVICAL.

DORSAL.

LUMBAR.

FIG. 41. SECTIONS OF SPINAL CORD FROM CASE OF FRIEDREICH'S ATAXIA. (*Pitt.*)

Etiology.—*Heredity.*—Although a single case may occur in a family, the occurrence of two or more in the same family is characteristic, and ten cases have been reported in a single family. There is generally a history of consanguinity, nervous disorders, inebriety, or nervous irritability, and is probably due to defective or feeble development. The infectious fevers have preceded the disease, though most likely a coincidence rather than a possible cause.

Pathology.—The most characteristic lesion is the diminution in size of the spinal cord. There is extensive sclerosis in the posterior and lateral columns of the cord, and degeneration to slight extent in the anterior columns. Extending upwards the sclerosis may involve the medulla.

Symptoms.—The first ataxic symptoms develop in the lower extremities though the gait is somewhat different from locomotor ataxia. There is more of a swaying, staggering, or irregular gait,

and less of a stamping character. When the upper extremities are involved, the movements are irregular and jerky, resembling chorea. Irregular movements may occur in arms or legs even when the patient is at rest. There may also be irregular swaying of the head.

Impairment of speech early develops. At first it may be difficulty in enunciation, as in stuttering, or a syllable or word is missed, until finally an unintelligible mumble results. Although the face is more or less expressionless, the intellect remains unaffected, though late in the disease there may be mental impairment. Romberg's symptom is generally present, and a peculiar deformity of the foot develops, known as the "pes cavus," a stumpy foot with the arch exaggerated, and the toes extended, the great toe being abnormally prominent. There may also be deformity of the hand.

Spinal curvature may also follow. The sphincters are not involved; there are no trophic changes in skin or joints, no optic neuritis, nor crises. Late in the disease paralysis appears.

Diagnosis.—Usually there is no difficulty in recognizing the disease, there generally being two or more cases in the same family; the age of the patient, between three and fifteen, the irregular shuffling gait, the deformity of the foot, and the imperfect speech, being characteristic.

Prognosis.—This is unfavorable as to cure, though the life may be prolonged twenty, thirty, or more years.

Treatment.—But little can be hoped for in treating this disease, other than in maintaining the general health. Hygienic measures, fresh air, and a liberal diet are to be secured.

SPASTIC PARAPLEGIA.

Synonyms.—Erb's Palsy; Primary Lateral Sclerosis; Spastic Spinal Paralysis.

Definition.—A chronic disease of the spinal cord, due to sclerosis of the descending fibers of the crossed pyramidal tracts, and characterized by loss of power, contractures, exaggerated reflexes, and a peculiar gait.

Etiology.—The disease generally occurs in neurotic families and between the ages of twenty-five and forty, males being more

frequently affected. Sexual excesses, syphilis, exposure, traumatism, and lead-poisoning have been looked upon as causal factors.

Pathology.—Sclerotic changes are found in the crossed pyramidal tracts. In primary lesions of the brain, the anterior median columns may be involved in the sclerotic process. The axis-cylinders of the nerve-fibers may be destroyed and disappear.

Symptoms.—The disease comes on slowly, the first evidence of any abnormal condition, being an undue weariness on walking, attended by stiffness and rigidity of the muscles. As the disease progresses, it is with difficulty that the patient can walk, the limbs are drawn close together, the knees touch or overlap in walking, the toes drag, and when the patient steps on the ball of the foot, there is clonic spasm of the muscles. As a result of

FIG. 42. POSITION OF LESION IN PRIMARY SPASTIC PARAPLEGIA. (*Taylor.*)

the contractions of the calf-muscles, the body is thrown forward and the patient walks with the crutches or cane thrown in advance of the body.

When the patient is in the recumbent position, clonic spasms may cause the legs to twitch or jerk.

The power of locomotion becomes more difficult with the advance of the disease, and is finally lost.

The knee-jerk is excessive and ankle-clonus is easily obtained. In the advanced stage, if the disease has extended high up the cord, the upper extremities become involved.

Ocular symptoms are rare, and the sphincters are not involved till late in the disease. With the exception of dull pains or fleeting pains in the back, there is an absence of sensory symptoms.

Of the secondary form, the symptoms depend upon the lesion, whether one or both motor tracts are involved, and are bilateral

or unilateral. As in the primary form, the symptoms generally appear gradually, there is weakness in the limbs, rigidity of the muscles, and increase of the reflexes, unless the lesion is total, when the reflexes are lost, and there is a flaccid paralysis.

Spastic paraplegia of infants, or congenital spastic paraplegia, is generally due to injury during child-birth, meningeal hemorrhage attending the manipulation of delivery. It may possibly be due, in some cases, to arrested development of the pyramidal tracts. The symptoms are not different from those already described, and may involve the upper as well as the lower extremities.

There may be imbecility, idiocy, or other mental defects.

Hysterical spastic paraplegia simulates the genuine type, though there is not the marked rigidity, especially upon extension. It develops suddenly and there is a history of hysterical attacks.

ATAXIC PARAPLEGIA.

Synonym.—Progressive Spastic Ataxia.

Definition.—A sclerosis of the posterior and lateral columns of the cord, in which the posterior root-zones escape, and the reflexes are retained.

Etiology.—The etiology is not well understood. It occurs in males between the ages of thirty and fifty. It may follow exposure to cold or sexual excesses, or follow an injury.

Pathology.—This is a combined sclerosis of the posterior and lateral columns, beginning in the lumbar region. The nerve-roots, however are not involved, differing from locomotor ataxia.

Symptoms.—The symptoms embrace those of spastic paraplegia and locomotor ataxia, and develop slowly. All the symptoms of spastic paraplegia are present, though the rigidity is not so marked. In addition, in the early stage, the power of locomotion is somewhat impaired; especially if he attempts to turn quickly, he will stumble, or if he attempts to stand with the feet close together, his body will sway, and in the dark or with the eyes shut, he walks with difficulty. As the disease progresses the gait takes on the characteristics of locomotor ataxia, though the *stamp* is not so forcible.

The reflexes are increased, the knee-jerk being exaggerated, and ankle clonus is present.

Sensory symptoms, especially the lightning pains and crises, are absent, though a dull pain may be experienced in the sacral region.

The Argyll-Robertson pupil is generally absent, and optic atrophy rarely ever occurs.

The sphincters are not usually involved, though menstruation is sometimes difficult.

The ataxia may extend to the upper extremities, and in some cases mental disturbance is pronounced.

Diagnosis.—The diagnosis is generally easy, the inco-ordination on the one hand, and the exaggerated knee-jerk on the other, show the existence of a combined disorder.

CERVICAL. DORSAL. LUMBAR.
FIG 43. POSITION OF LESION OF ATAXIC PARAPLEGIA. (*Taylor.*)

Prognosis.—The disease being progressive, the prognosis is unfavorable as to cure, though the patient may live for years, and death generally results from intercurrent diseases. In some cases the disease is arrested for a time.

Treatment.—The treatment will be along the same line as that for locomotor ataxia.

MULTIPLE SCLEROSIS.

Synonyms.—Insular Sclerosis; Disseminated Sclerosis; Cerebro-Spinal Sclerosis.

Definition.—A disease characterized by the development of chronic inflammatory spots, or sclerotic patches of the central nervous system, and may occur either in the brain or cord, or brain and cord combined.

Etiology.—The specific or exciting cause is unknown. Among the predisposing causes may be named age, it being a disease of early life, and rarely occurs after the age of forty. Hysteria, trauma, exposure, cold, and the infectious diseases may be causal factors. There is no preference for sex, if we except the neurotic state in certain females. Heredity is also a predisposing factor.

Pathology.—Prof. Taylor, an English authority, clearly describes the anatomical changes that take place. "The surface of the spinal cord, medulla oblongata, pons varolii, and base of the brain, present a number of irregular patches of pinkish-gray color, rather sharply outlined, and contrasting with the natural white color of the medulla, pons and crura. On section, the discoloration is found to extend inwards so far as to form deposits of a round or oval shape, ranging in size from that of a pea to that of a hazel-nut, generally harder than that of the normal nervous tissue, and even leathery or cartilaginous, sometimes projecting above the level of the section, sometimes sunken below it. Recent patches are dark gray, older patches more yellowish gray, and less translucent. They affect the white matter more than the gray matter; thus in the spinal cord the greater part of the cornea is unaffected, and in the cerebrum they are best seen on section of the hemispheres, which are dotted with gray areas, and the walls of the lateral ventricles are often invaded. They are not frequent in the cerebellum; but the sclerosis may invade the olfactory bulbs, and the spinal and cranial nerve-roots.

"Under the microscope the outline of the patch or nodule is much less distinctly marked than it appears to the naked eye. The nodule consists chiefly of fibrous or finely fibrillated tissue, developed by overgrowth of the neuroglia; within this area the nerve fibers have lost their myelin sheaths, but great numbers of axis cylinders persist. Nerve-cells are very little involved unless late in the disease. There may be some thickening of the vessels, but it is rarely pronounced."

Symptoms.—The disease may begin insidiously, the patient simply noticing that he is growing weaker, tremulous, or spastic, or there may be a more rapid beginning, the patient behaving as though affected by hysteria. Thus the knees suddenly give way, or there is a sudden weakness of one arm or leg; this may soon improve temporarily, and then the same or another limb becomes

paretic. When the disease is fully developed, however, there are *three* prominent and characteristic symptoms present:

1. *Tremor of muscles on attempting motion.*—The tremor is volitional, there being no abnormal movement when the patient is at rest; hence the term, *intentional* tremor. It is best noticed in the hand and arm in attempting to take hold of an object, the limb trembles or oscillates from side to side, or up and down, with regard to the object aimed at, the deviation often being quite marked. When standing, the body swings to and fro, and there is a nodding motion of the head. On attempting to walk, there is a trembling motion of the legs. The tendon reflexes are increased and ankle clonus may be present.

When the patient is quiet in bed or sitting in a chair with the back, head, and arms supported, there is an absence of tremors.

2. *Syllabic or Scanning Speech.*—In talking, the speech is at first only slow or drawling, but later each syllable is uttered slowly and distinctly, with a slight rising and falling inflection, and is known as scanning.

3. *Nystagmus.*—Oscillation of the eyeballs, when the eyes are fixed upon some object or when they are much turned to one side, being the result of voluntary movements as seen in the limbs. Optic-nerve atrophy is not infrequent. Sensory symptoms are not pronounced, and consist of tingling or numbness of the limbs and hyperesthetic areas that are transient in character. There is no atrophy of the muscles nor trophic changes. Vertigo is often present. The function of the bladder, rectum, and sexual organs may be retained, though involuntary expulsion or retention of urine is not uncommon.

There is generally impairment of the mental faculties, at first hysterical in character, but later maniacal tendencies may develop, or dementia result. Epileptiform or apoplectiform attacks may occur, though usually rare.

Diagnosis.—The diagnosis is usually easy after the disease is well established, the three characteristic symptoms, *tremors*, *syllabic* or *scanning speech*, and *nystagmus*, being easily recognized.

Prognosis.—The disease may extend over a period of years, from five to twenty, death occurring from some intercurrent disease. Death rarely occurs from a convulsion or apoplectiform attack. The prognosis as to cure is always unfavorable.

Treatment.—The treatment is mainly symptomatic, and along the same lines as other forms of sclerosis.

PROGRESSIVE MUSCULAR ATROPHY.

Synonyms.—Poliomyelitis Anterior Chronica; Wasting Palsy.

Definition.—A chronic degeneration of the motor tract and characterized by a progressive wasting of the muscles. The disease is one of adult life, and occurs generally between the age

FIG. 44. TWO VIEWS OF A HAND OF A PATIENT SUFFERING FROM PROGRESSIVE MUSCULAR ATROPHY. (*Ranney.*)

of thirty and fifty years. It affects males more frequently than females.

Etiology.—The cause is unknown, though quite a variety of causes have been mentioned by various writers, the most important being the following: Heredity, excessive muscular effort, exposure to cold, traumatic injuries of peripheral parts of the body, the *infectious fevers*, typhoid fever, influenza, diphtheria, measles, rheumatism, etc., and excessive venery and masturbation.

Pathology.—A slow degeneration of the ganglionic cells resulting in their partial or complete destruction. "The neuroglia

is excessively developed," while the anterior nerve-roots passing from the horns are *atrophied*. There is an abnormal dilatation of the vessels of the cord, and sclerosis of the arterioles.

The muscles become shrunken and pale in color to the unaided eye, and the microscope "reveals a disappearance of the transverse striæ in the fibrille," while fat connective tissues replace the muscular fiber in the advanced stage. "As to the relation of the nervous changes to the muscular atrophy, the conspicuous symptoms of the disease, there is more than one possible explanation. As in bulbar palsy, according to one view, the atrophy of the anterior cornua, is primary, the result of chronic poliomyelitis anterior, the degeneration of the peripheral nerves and muscles being secondary to it.

"According to another view, the muscular atrophy is primary, possibly due, as Friedreich sought to prove, to a myositis, followed by fatty metamorphosis of the sarcous substance and subsequent absorption of fat, or to a simple primary fatty metamorphosis." Tyson.

Symptoms.—The disease comes on insidiously, the characteristic feature of which is the development of extensive and progressive atrophy of certain muscles. The disease generally begins in the upper extremities, though the lower may be involved first.

The patient's attention is called to the wasting of certain muscles, by the loss of power in the affected part, this being usually manifested in the hand and shoulder. Beginning with the short muscles of the thumb, there is soon flattening of the ball and the simultaneous wasting of the interossei results in depressions between the metacarpal bones. On account of a predominance of power in the extensors and abductors of the hand, the "ape-hand" becomes characteristic.

As progressive changes take place and the interossei become more affected, the hand assumes greater deformity and we have the "*claw-hand*." With atrophy of the lumbricales, there is *flattening* of the palms. From the hand the wasting attacks the muscles of the forearm and thence to the arm and shoulder. "In the forearm, the extensor muscles undergo atrophy more frequently than the flexors."

When the shoulder becomes involved, the deltoid becomes flattened and the movements of the arm are more or less im-

paired. The atrophy generally attacks the right hand before involving the left. With marked atrophy of the arms, the process extends to the muscles of the scapula and trunk.

Late in the disease, the muscles of the lower extremities become involved, the flexor muscles being the first to be attacked.

When the diaphragm undergoes atrophy—a rare case—respiration becomes greatly impaired.

In proportion to the wasting, the electrical excitability fails,

FIG. 45. POSITION OF HANDS AND FINGERS IN ULNAR PARALYSIS OF LONG STANDING; BIRD-CLAW HAND; "MAIN EN GRIFFE."—(Duchenne.)—(Tyson.)

A. A. Wound of the ulner nerve. B. B. B. B. B. Ends of the metacarpal bones. D. Tendons of the flexor sublimis digitorum. C. Muscles of the ball of the thumb.

faradic and galvanic diminishing together. The reflexes are generally lost, the knee-jerk remaining longest since the lower extremities are among the last to be involved.

Fibrillary contractions are constant and characteristic symptoms. Sensation is not impaired, and the bladder and rectum are not involved.

The disease is slow in its course, the patient frequently dying of some intercurrent disease, as pneumonia, tuberculosis, etc.

Diagnosis.—"Progressive muscular atrophy has to be distinguished from all other diseases accompanied by atrophy of muscles. The important feature is the slow commencement by atrophy and weakness together, without pain, spasm, or sensory troubles. This distinguishes it from *tumor* and *meningitis*, which may cause muscular atrophy. In acute *poliomyelitis* of children and adults, the history is completely different. In the typical cases of *amyotrophic lateral sclerosis* the course is more rapid, and the reflexes are early increased. When the atrophy affects the hand alone, the deformity resembles somewhat the result of lesion of the *ulnar nerve*; but in this last the ulnar half of the hand is more decidedly affected (the radial lumbricales being supplied by the media nerve), and anesthesia and trophic changes occur; in traumatic cases, the history of injury will, of course, help. *Lead paralysis* is recognized by the extensors being first, and generally alone, affected; by the blue line on the gum, the detection of lead in the urine, and perhaps by the occupation, and preceding attacks of colic. *Multiple neuritis* is distinguished by the rapid onset, the wide extent of the parts affected, the numbness of anesthesia, and the tenderness of the muscles. *Pseudo-hypertrophic paralysis* must be recognized by the enlargement of muscles, and its development in childhood; *idiopathic muscular atrophy*, by the atrophy beginning differently; *e. g.*, in the face or legs." Taylor.

Prognosis.—This is unfavorable as to cure, though in rare cases the progress of the atrophy is arrested.

Treatment.—Medication has but little effect upon the progress of the disease. The patient's general health will be improved by the use of the bitter tonics and by hygienic and dietetic measures. Arsenic and strychnia have been extolled as influencing the diseased processes, though this is doubtful. Massage and electricity should be faithfully tried. When possible, the patient should seek an equable climate where he could be much in the open air and sunshine, and free himself from mental worry. Gradually, but surely, however, the disease advances, finally resulting in death.

BULBAR PARALYSIS.

Synonyms.—Glosso-labio-laryngeal Paralysis; Duchenne's Disease.

Definition.—An acute or chronic disease of middle age, due

to involvement of the motor nuclei of the medulla oblongata, and characterized by paralysis of the lips, tongue, larynx, and pharynx, resulting in impairment of speech, phonation, mastication, and deglutition. Two forms of bulbular paralysis are recognized, the acute and the chronic.

Etiology.—Bulbular paralysis is a disease of middle and advanced life, between the ages of forty-five and seventy, and is more frequent in men than in women. It may be due to hemorrhage, embolism or softening, exposure to cold, trauma, or diphtheria. Lead-poisoning and syphilis have also been named as possible causes.

Pathology.—The most pronounced changes are found in the nerve-roots proceeding from the medulla; those of the hypoglossal, glossopharyngeal, vagus, facial, the motor nucleus of the fifth, and spinal accessory, showing distinct atrophy. They are of a gray or grayish-red color, and much shrunken. The microscope reveals degeneration of the nuclei or complete disappearance of the nerve-cells, some increase of the neuroglia, and thickening of the vessel-walls.

Muscular atrophy is limited to the lips, tongue, palate, and muscles of the larynx, and if spinal atrophy be associated, the muscles of the neck, shoulders, or arms are involved in the process.

Symptoms.—The onset is sudden, and may be attended by nausea and vomiting. Articulation is indistinct, especially in the use of the linguals, labials, and dentals: l, m, p, b, t, d, etc.

The lower lip being affected, it drops and there is dribbling of saliva. Deglutition is difficult, with frequent attacks of choking. The mind is unimpaired, the patient becomes quite emotional and neurasthenic. There may be hemiplegia or crossed facial paralysis.

Chronic Form.—The symptoms of this form are very gradual in their development, the first noticeable feature being a difficulty in controlling the tongue and articulating sounds that depend upon it,—thus words containing e, r, s, l, k, g, d, t, n, and sh. As the disease progresses, the paralysis of the tongue becomes more pronounced; it can not be protruded, and lies on the floor of the mouth. Next in order, the lips become involved, and the labials p, b, f, v, m, and o are pronounced with difficulty, and

blowing and whistling are impossible. The lips atrophy and drop, exposing the teeth, and the saliva dribbles away.

Following the lips, the palate becomes paralyzed, and liquids are regurgitated through the nose, and the voice becomes nasal. Increased difficulty in swallowing is now experienced, for in addition to the inability of the tongue to carry the bolus backward, there is paralysis of the pharynx. In time the laryngeal muscles become involved, resulting in hoarseness and, finally complete aphoria. In swallowing, food is apt to enter the larynx, producing attacks of choking, and not infrequently particles find their way into the bronchi or lung, giving rise to bronchitis and deglutition pneumonia. At the last the patient's condition is most deplorable and disgusting, for, with mind impaired, he resembles a "driveling idiot." He can not talk, swallow, or close his mouth, and the saliva and particles of food dribble away.

There are no sensory symptoms, and the taste remains normal.

Diagnosis.—This is generally quite easy, the above symptoms being so striking and characteristic that no one need make a mistake in the diagnosis.

Prognosis.—This is unfavorable, though the disease may last for several years. Death usually results from exhaustion, inanition, choking, inspiration pneumonia, or circulatory disturbances.

Treatment.—Since the disease is incurable the treatment will be symptomatic. The general health is to be maintained and the patient instructed in the introduction of the esophageal tube, for feeding will have to be conducted in this way in the last stage of the disease. Electricity is of doubtful utility.

SYRINGOMYELIA.

Synonym.—Gliosis Spinalis.

Definition.—A disease of the spinal cord due to a new growth in the gray substance about the central canal, which results in the formation of cavities.

Etiology.—Nothing definite is known as to the exciting cause, though trauma, syphilis, and the infectious diseases, especially typhoid fever, have been suggested as etiological factors. It occurs between the ages of fifteen and thirty years.

Pathology.—The disease is generally regarded as a gliosis with degeneration of the central portion of the cord, resulting in the formation of small cavities of various shapes. They are more frequently found in the dorsal and cervical regions, though the entire length of the cord may be involved. The posterior and posterolateral tracts are the most often involved; though generally independent of the central canal of the cord, they usually communicate with it.

"The wall of these cavities is generally composed of a firm fibrous tissue, or of myxomatous tissue. Its inner surface may or may not be lined with epithelial cells of the cylindrical variety. They usually contain a serous or hemorrhagic fluid, and occasionally a hyaline material." (Ranney.)

Symptoms.—There are three characteristic symptom groups:

1. *Modified sensibility*, especially to *pain*, *temperature*, and to a certain degree, *touch*.
 2. *Progressive muscular atrophy*, with paralysis.
 3. *Trophic* disturbance, in the skin, muscles, bones, or joints.
- With these symptoms, there may be associated, as the disease progresses, spastic paraplegia, symptoms of transverse myelitis, or those due to involvement of the lateral, posterior, or in fact all the columns of the spinal cord.

The symptoms develop gradually, and usually make their appearance about the period of adolescence. As the cavity is most frequently located in the cervico-thoracic region, the arms and neck are the first to be affected. There are aching pains in the neck and arms, with numbness in the hands and loss of the pain and temperature senses. Weakness and atrophy of the muscles follow, attended by trophic changes, such as ulcers, brittleness of the nails, and painless felons.

Later, with the extension of the disease, spastic paresis of the legs follows, and the bladder and the rectum may be involved. From the involvement of the spinal muscles, curvature of the spine often accompanies the disease. With the progress of the disease the symptoms become more general, larger areas of modified sensibility take place, and more extensive trophic changes are noted. Charcot's joint, shoulder, or elbow, edema of the fingers, bullæ, ulcers, felons, loss of nails, and brittleness of bones are noted.

If the posterior columns are involved, inco-ordination of the muscles occurs similar to that of locomotor ataxia.

The reflexes vary, and may be either lost or exaggerated. Where the disease extends to the medulla, the cranial nerves become involved, giving rise to bulbar symptoms.

Diagnosis.—The three characteristic and typical features—modified sensibility to pain and temperature, extreme muscular atrophy, with paralysis and trophic disturbances, to which may be added spasticity of the lower extremities—make the diagnosis comparatively easy.

Prognosis.—Although the disease may extend over a period of years, the prognosis is always bad, though death usually results from intercurrent diseases.

Treatment.—The treatment can only be symptomatic. The means to preserve the general health, climatic, hygienic, and dietetic, must be observed and conditions met as they arise.

AMYOTROPIC LATERAL SCLEROSIS.

Synonyms.—Charcot's Disease ; Wasting Palsy ; Spinal Muscular Atrophy.

Definition.—A degeneration of the motor tract of the cord, and attended by progressive muscular atrophy, loss of power, and spastic paraplegia.

Etiology.—Charcot's disease is of unknown etiology, occurring between the ages of twenty-five and fifty, usually after thirty, and is found more frequently in women than in men. It is closely allied to progressive muscular atrophy.

Pathology.—"A *sclerosis* of the *crossed pyramidal tracts*, in the two lateral columns and the *direct pyramidal tracts* in the anterior columns, is essential to the morbid anatomy in a typical case. As important is *atrophy* of the corresponding *large ganglion* cells in the anterior cornua and medulla. The degeneration has been traced in the pyramidal tracts from the sacral cord upward to the pyramids in the medulla oblongata, sometimes even through the pons and crura into the internal capsule and center convolutions, in which, too, the large ganglion cells have been found atrophied." (Tyson.)

Symptoms.—Charcot's division of this disease into three stages is recognized in all typical cases, and are as follows:

1. In the first stage the upper extremities only are involved.
2. In the second stage the lower extremities are attacked.
3. In the third stage, bulbar symptoms are present, the medulla being attacked.

There rarely occur atypical cases, in which the third stage becomes the first, the medulla being first attacked, the disease gradually extending downwards; or the lower extremities may be first involved, the disease gradually extending upwards.

First Stage.—This stage begins with weakness of the upper arms and a gradual wasting of the muscles, and fibrillary twitching, to be followed by paralysis. The atrophy soon spreads, and may involve the whole upper extremity, though the characteristic deformity of the disease is seen in the hand and wrist, and is known as the "claw-hand," the rigidity being due to contraction of the atrophied muscles. "The upper arm lies close to the chest, the forearm is semi-flexed and pronated, whilst the wrist is strongly flexed, and the fingers are bent into the palm."

The tendon reflexes are exaggerated, as may be demonstrated by striking the tendons of the biceps and triceps, or the lower ends of the ulna and radius.

Occasionally the muscles of the neck and jaw share in the spasm, and may remain rigid for a long time, but this gradually disappears, with marked contractions of the hand.

The duration of the first stage varies from four to twelve months.

Second Stage.—After the disease has progressed for some months, the muscles of the lower limbs become involved, and tonic or clonic spasms may develop. The knee-jerk is increased, and ankle clonus can be obtained. Rigidity and contractions are seen in some of the muscles, though sooner or later this gives way to atrophy and fibrillary twitchings.

Sensation is usually not disturbed, nor is there loss of the use of the sphincters.

Third Stage.—As soon as the disease extends to the medulla the third stage is ushered in, and bulbar symptoms appear. Paralysis of the lower part of the face occurs, the mouth is not completely closed, the saliva dribbles and articulation and deglutition are greatly impaired.

When paralysis of the pneumogastric nerve occurs, serious disturbances of the circulation and respiration follow, and sometimes cause death.

The mental faculties are but slightly affected, though the emotions are often prevented, the patient laughing or crying without cause.

Diagnosis.—The diagnosis is readily made if we keep in mind the characteristic stages and symptoms of each. Beginning with weakness in the arms, there soon follows atrophy of the muscles, and paralysis with contractions, giving the “claw-hand;” this in turn is followed by spastic paralysis of the lower extremities, which, in turn, is followed by the bulbar symptoms.

Prognosis.—The prognosis is unfavorable both as to life and improvement of the wasted and paralyzed muscles. Death generally follows in from one to three years, due to impairment of the circulatory and respiratory functions, the result of an extension of the morbid changes to the nuclei of the medulla.

Treatment.—But very little can be suggested in the way of cure, or even to retarding its progress. Ranney claims to have relieved the contractions of the muscles and checked the progress of the disease for many months, by employing static sparks daily to the spine and limbs, while Gowers favors the injection of nitrate of strychnia into the muscles, beginning with the minimum and rapidly increasing to the maximum dose. Massage will afford some relief to the contracted muscles. Good hygienic surroundings should be encouraged, and the patient rendered as comfortable as possible.

COMPRESSION OF THE SPINAL CORD.

Synonym.—Compression Myelitis.

Definition.—An impairment of function of the cord, due to gradual compression.

Etiology.—According to Taylor, of Guy's Hospital, the most common cause of compression of the cord is caries of the spine, not, as he says, from “angular curvature,” which the caries produces, but from the inflammatory or caseous products, which form between the diseased bone and the external surface of the

dura mater, destroying the posterior common ligament, and setting up an external pachymeningitis.

Of less frequent occurrence, acting as causes, may be named tumors, carcinomatous and sarcomatous growths, and aneurisms.

Pathology.—The alteration in the shape of the cord depends upon the amount of compression. The cord is flattened and may be narrowed to one-half or one-third its natural diameter; myelitis follows, and the cord, in the early stage, shows some engorgement and softening, but later sclerosis follows, attended by “degeneration of the posterior columns above the lesion, and in the pyramidal tracts below the lesion.”

The microscopical changes are those peculiar to myelitis. While the nerve-roots will show more or less impairment, many nerve-fibers will remain intact.

Symptoms.—In typical cases there are two groups of symptoms, one due to pressure upon the nerve-roots, the other to involvement of the cord itself. Pain, neuralgic in character, and darting along the course of the nerve, is characteristic of the first. There will be areas of anesthesia, “*anesthesia dolorosa*,” and muscular spasms, followed by paralysis, loss of the reflexes, and atrophy of the muscles.

Areas of *hyperesthesia* frequently accompany the anesthesia. Occasionally, trophic disorders of the skin are present, zona, bullæ, or eschars.

“The symptoms due to direct compression of the cord are those with which we are familiar in transverse lesions: paralysis, anesthesia, or other modification of sensation, increased reflexes, often some vesical trouble, and generally spastic rigidity of the paralyzed muscles. The relation of anesthesia to paralysis varies much in different cases, and in the same case at different times. Loss of motion is, as a rule, the most prominent symptom, and anesthesia may be entirely absent. The activity of the reflexes is often in excess of the motor paralysis. It is another important feature, when the compression results from caries, that recovery may take place completely, or improvement may again be followed by relapse. The site of the compression, of course, determines some differences in the symptoms. Compression *limited to one side* will cause the pains to be unilateral, and the paralysis may be on the same side, the anesthesia on the opposite, as has been

stated to be the result of strictly one-sided lesions. *Cervical* compression may be accompanied by alterations of the pupil, especially dilatation from irritation of the cilio-spinal center, by cough and dyspnea, dysphagia, vomiting, or very slow pulse. The distribution of the paralysis is also sometimes striking: all four limbs may be paralyzed, the upper limbs being wasted, with diminished reflexes, as a result of compression of the nerve-roots or their centers. But the arms may be paralyzed as a result of compression above the origin of their nerves, and the muscles will then preserve their volume and their electrical reactions, while the reflexes are increased. In some such cases the legs remain unaffected. The distinctive features of compression of the *lumbar* region are paralysis, with flaccidity, wasting, diminution of the reflexes, paralysis of the sphincters, and tendency to bed-sores." (Taylor.)

Diagnosis.—If caries of the vertebra be present and spinal symptoms appear within a few years after the removal of cancer of the breast, the diagnosis will be comparatively easy; if, however, compression of the cord occurs from the exudate before the evidence of caries appear, the diagnosis may be very difficult, especially if the root symptoms be absent.

Prognosis.—The prognosis is more favorable when due to caries than from other causes, though years may elapse before a cure is effected.

Treatment.—When due to caries, some one of the many devices now in use should be selected to produce extension. It may be suspension, a favorite method in use a few years ago, or a plaster cast, or some mechanical appliance that secures hyperextension while in the recumbent state. Mere rest in bed has proven of much benefit, where it can be maintained for weeks or months. Where the disease is due to other causes, the treatment is generally unavailing. In general the treatment will be that used in tuberculosis.

The patient should be much in the open air, the diet should be easily digested, but nourishing. Arsenic, Howe's acid solution of iron, nux vomica, hydrastin, echinacea, and remedies of like character, will be used. Massage and electricity should be tried. Work along the line of official treatment, often does more for the patient than medication.

III. DISEASES OF THE BRAIN AND ITS MENINGES.

DISEASES OF THE DURA MATER.

EXTERNAL PACHYMENINGITIS

Synonym.—Simple Meningitis.

Definition.—An inflammation of the external layer of the dura mater of the brain.

Etiology.—The most frequent cause is fracture of the skull, with its consequent extravasation of blood. Next in order is caries of the middle ear or of the frontal or ethmoidal sinuses. Syphilis, erysipelas, or carbuncle may also be the exciting cause.

Pathology.—The dura is thickened, due to infiltration of blood and pus, and these products, collecting between the dura and the skull, are apt to give rise to localized abscess. Where due to syphilis, there is generally marked thickening of the inner table and much pus between the dura and the bone. Where there is an infiltration of pus between the two layers of the dura, dura-arachnitis may follow.

Symptoms.—The symptoms are not well defined in mild cases, and are apt to be overlooked, headache being the only evidence of the lesion. In the more severe types there will be a chill, followed by fever, headache, more or less dullness, which in turn is followed by stupor. Paralysis and convulsions occur in rare cases. Should rigors occur, they would suggest pyemia. There is more or less tenderness over the part affected.

Treatment.—The treatment is mostly surgical, and consists in trephining for the liberation of pus. In the milder cases, counter-irritation, and the properly selected sedative should be used. When due to syphilis, echinacea, Donovan's solution, berberis aquifolium, corydalis formosa, or stillingia will be found useful as well as potassium iodid.

INTERNAL PACHYMENINGITIS.

Synonyms.—Hemorrhagic Pachymeningitis; Hematoma of the Dura Mater.

Definition.—Extravasation of blood into the inner membrane of the dura mater.

Etiology.—This is a secondary lesion, following inflammation of the external membrane of the dura mater, or occurring as the result of tuberculosis, Bright's disease, leukemia, erysipelas, pyemia, puerperal fever, syphilis, or any other disease causing degeneration of the blood-vessels.

Pathology.—On the inner surface of the dura, a fibrous exudate is found which develops into fibrous connective tissue in which one or more slight, rarely profuse, hemorrhages occur, and as a result a quantity of blood accumulates between the dura and the arachnoid; hence the term hematoma is applied to it. A favorite location is beneath the parietal bone. It may be bilateral, though usually but one side is affected.

Symptoms.—These are not characteristic; in fact, they may be so obscured by the primary disease giving rise to it as to pass unnoticed. Pressure symptoms are frequently present, and monoplegia or hemiplegia may occur. Headache is perhaps the most constant symptom, and convulsions are not unfrequent.

Diagnosis.—This is extremely difficult, the clinical symptoms not being sufficiently constant to suggest the lesion.

Prognosis.—This is unfavorable, there always being a tendency to meningitis and danger from thrombosis.

Treatment.—This will always be along the line of meningitis, and when a large hemorrhage is recognized, surgical measures will be necessary.

DISEASES OF THE PIA MATER.

ACUTE LEPTOMENINGITIS.

Definition.—An inflammation of the pia and arachnoid membranes of the brain.

Etiology.—This is generally, if not always, a secondary lesion, the most frequent primary lesion being disease of the sinuses,

the nose, or the middle ear. Being strictly an infectious disease, a great variety of bacteria have been found, besides the staphylococci and streptococci, those peculiar to the infectious fevers in general, but especially pneumonia, influenza, erysipelas, enteric fever, measles, scarlet fever, endocarditis, septicemia, diphtheria, and tuberculosis. Of the more chronic diseases that may precede it, may be mentioned Bright's disease, rheumatism, arteriosclerosis, and gout.

The disease is found more frequently between the ages of thirty and fifty, though when due to tuberculosis it is most common in children.

Pathology.—The locality, extent, and degree of tissue-changes vary; thus if due to middle-ear disease, the lesion will be unilateral and over the temporo-sphenoidal lobe; if due to pneumonia, endocarditis, or any infectious disease, the process will generally be bilateral and limited to the cortex, while at times the base alone is involved. The exudate varies from a fibrous exudate to a purulent or hemorrhagic infiltrate. The ventricles may be dilated, especially in children, and contain a turbulent fluid. When the exudate becomes purulent, the various micro-organisms peculiar to septic processes and infectious diseases, are found in the fluid.

Symptoms.—These naturally vary, depending upon the location of the lesion, the extent of the inflammatory process, and the producing cause. When due to middle-ear lesions, the symptoms are those of well-defined meningitis, either tubercular or those of the epidemic form.

If the meningitis be a complication of any of the severe infectious diseases, the symptoms of the primary disease may obscure those of the local affection.

In the greater number of cases, however, there will be a train of symptoms quite characteristic. Headache, severe and protracted, is always present; delirium, followed by coma, soon appears in many cases. The pulse is often slow, though in children it may be very rapid. Vomiting is present in a great many cases.

Photoshobia, intolerance to sound or irritation of the head, are seen in all severe types. Where the *base* is involved, the cranial nerves are affected, and strabismus, ptosis, or facial paralysis follow, and if the fifth nerve be involved, trophic changes are

common symptoms. As the disease progresses, the spine becomes rigid, there is great retraction of the head, and opisthotonos may be pronounced. Convulsions, in children of nervous temperament, are apt to occur.

The suppurative process is announced by chills, and fever of an irregular or septic type.

Diagnosis.—The primary affection may so obscure the meningeal lesion for a few days as to make an early diagnosis quite difficult, if not impossible; sooner or later, however, characteristic symptoms develop, and there should be few mistakes as to the disease.

We must differentiate the tubercular from the non-tubercular form, and, if attention be paid to the following well-marked characteristics of the tubercular type, the difference can be readily seen. In tubercular meningitis there is a *history* of tuberculosis and the *forming* stage is of *long* duration. There is no *apparent* cause for the meningeal lesion. Generally there is the presence of *tuberculosis* in the lungs, and the meningeal lesion runs a more protracted course.

Prognosis.—Although a grave disease, it is not necessarily fatal.

Treatment.—The treatment does not differ materially from that used in epidemic cerebro-spinal meningitis. When due to middle-ear disease, operative measures afford some relief, and pave the way to recovery.

CEREBRAL LOCALIZATION.

That man is the most wonderful piece of mechanism in the universe is conceded by all, and each individual part of this composite being must be thoroughly understood by the medical man, if he is to successfully combat the countless functional and organic lesions that daily beset him.

Life is too short, however, for any one man to master all, or even one important part, of every organ. The medical man of the present day has come to understand this as never before, and has divided his labor by selecting some special part for his life-work. Thus we have the *specialist* on the circulatory system, the respiratory apparatus, the blood, the skin, the eye, the ear, etc.

What is true of the body at large, is especially true of the brain. The study of this composite organ during the last few years has completely revolutionized the theories of this most wonderful organ, the seat of all the higher mental faculties and the director of all the voluntary motions, which distinguishes man from the entire animal world, and places him in a class by himself.

Much has been learned by vivisection on the lower animals, much by accidents and disease of the brain, and much by the pathologist after death; and from the combined experience of the experimentalist, the physiologist, the pathologist, and the clinician, the architecture and physiology of the brain has made wonderful advances during the last few years.

The study of the brain is a life-study, and in a work on general practice we can but glance at some of the more important lesions, referring the student for further research to special works upon the brain and nervous system. The general practitioner, however, should understand that the brain must be regarded as a *composite organ*; that each of its parts has some special function that, to some extent, is independent of its fellow-member.

Thus one part, the *medulla oblongata*, is essential to vital processes, and the slightest injury, even the thrust of a needle, may result in instant death. Another presides over the various movements of the body, and an injury or disease of this part is followed by paralysis of motion; or it may be that the part that presides over sight, or hearing, or taste, or smell is involved, and the function of the eye, or the ear, or taste, or smell is impaired.

Through the researches of Meynert, Luciani, Charcot, Exner, Nothnagle, Ferrier, Flechsig, Wernicke, Munk, and others, the topography of the brain has been so well outlined that the skilled neurologist of to-day can, by carefully noting the symptoms, locate the diseased condition, and not infrequently cure the disease by removing the cause by operative measures. Thus epilepsy has been overcome, when due to pressure upon some part, by removing the source of irritation. Aphasia, or loss of speech, has been restored by opening and draining an abscess of the third frontal convolution, the seat of speech centers.

The topography of the cerebral cortex is now so well understood that it is possible to map, with great accuracy, the various regions in which motor impulses originate.

The cerebrum is divided into two hemispheres, each of which

consists of five lobes,—the *frontal*, the *parietal*, the *occipital*, the *temporo-sphenoidal*, and the *central*, or island of Reil. These are divided or separated by three fissures,—the *fissure of Rolando*, the *fissure of Sylvius*, and the *parieto-occipital fissure*.

The frontal lobe consists of *three convolutions*,—the *superior frontal*, the *middle frontal*, the *inferior frontal*, and the *ascending frontal*.

The parietal lobe consists of three convolutions,—the *ascend-*

FIG. 46. A diagram designed to illustrate the probable functions of different areas of the cerebral cortex. (*Ranney.*)

ing parietal (posterior central) convolution, the *superior parietal*, and the *inferior parietal*.

The occipital lobe consists of three convolutions,—the *superior*, the *middle*, and the *inferior* convolutions.

The temporo-sphenoidal lobe consists of three convolutions,—the *superior*, the *middle*, and the *inferior* convolutions.

The central lobe, or island of Reil, consists of six.

“The surface of the brain is the seat of all conscious mental

action. It is the receptacle of all the impressions made upon the organs of sight, smell, taste, hearing, and the tactile organs of the skin. Here, and only here, do such impressions become transformed into conscious appreciation of external objects."

By examining diagrams, one gets a clearer idea of the areas that control certain functions. Thus the higher mental faculties, reason, will, judgment, etc., are the result of cell activity in the frontal lobe, while the *power of speech* resides in the inferior

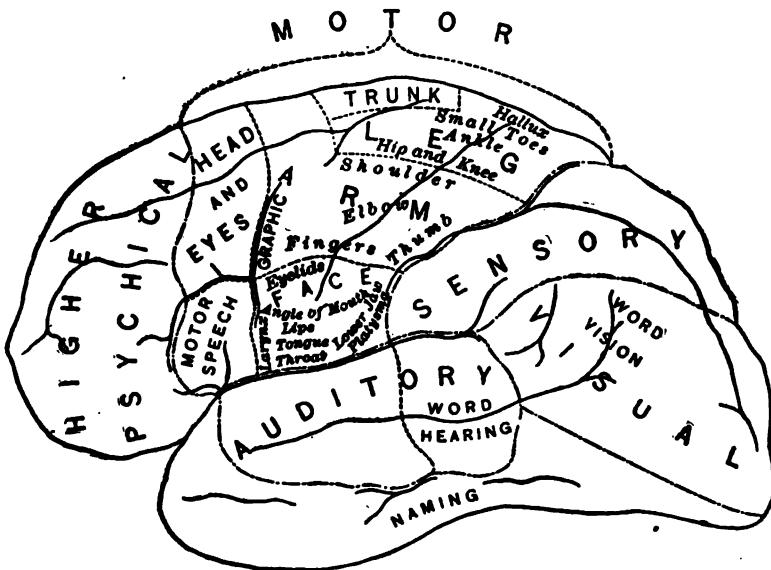


FIG. 47. Diagram of the cortical centers and areas of representation on the lateral aspect of the hemisphere (Mills). (Anders.)

frontal convolution of the same lobe. A part of the frontal and parietal (central convolution) presides over all motor acts of the limbs and body. The upper parts control the legs chiefly, the middle part governs the hand and arm, while the lower part presides over the complex movements of the tongue and lips necessary to speech.

The parietal lobes, not occupied by special centers of motion, are centers of touch, pain, and temperature.

The temporal lobes preside over sounds, odors, and taste.

The occipital lobes preside over sight.

AFFECTIONS OF THE CEREBRAL BLOOD-VESSELS.

HYPEREMIA.

Definition.—Hyperemia of the brain is an abnormal amount of blood in the cerebral capillaries, and may be active or passive.

Active Hyperemia.—This probably attends any increase in the general circulation, and is found in greater or less degree in all inflammatory diseases. It may follow prolonged exposure to the sun, to the ingestion of certain drugs, notably nitroglycerin, amyl nitrate, and alcohol. Excessive brain-work will give rise to cerebral hyperemia, while not infrequently the cause is reflex. The infections that are attended by restlessness, delirium, or other cerebral disturbances, also give rise to it.

Passive Hyperemia.—Any cause that obstructs the cerebral sinuses or veins, retarding the free flow of blood from the brain, will give rise to passive hyperemia. Of the most common are pressure upon the superior vena cava and jugular veins by tumors or aneurisms, though valvular lesions of the right heart, emphysema, and asthma bear an almost equal share as causal factors.

Pathology.—There are no characteristic changes from hyperemia, either active or passive. In the active form there may be a slight increase in the puncta vasculosa and a darkening of the white substance, while the veins and sinuses may be filled with dark blood in passive congestions, and there is more or less edema of the tissues.

Symptoms.—*Active hyperemia* is characterized by the *flushed* face, bright eyes, contracted pupils, and throbbing of the carotids. There is more or less headache of a throbbing character; the patient is irritable and restless, with more or less insomnia. In the rare cases there will be delirium or convulsions. There is hyperesthesia of the special senses.

In *passive hyperemia* there is dullness of the intellect, the pupils are dilated, and the patient lies passive. If there be headache, it is dull in character. The face is pale or dusky in color. The pulse is small, the tissues relaxed, and the extremities are cold.

Treatment.—In gelsemium we have a specific for active hyperemia of the brain. It acts nicely with either aconite or vera-

trum, or it may be given alone. Add from twenty to sixty drops of the specific tincture (according to the age of the patient and the irritability of the nervous system) to four ounces of water, and give a teaspoonful every one, two, or three hours, as may be indicated.

Passiflora.—In nervous children, with insomnia as the chief symptom, add from one to four drams of *passiflora* to four ounces of water, and give a teaspoonful every one or two hours. When very wakeful, we may give the agent in still larger doses. Thus—

℞ *Passiflora*.

Simple Syrupaa ℥i.

Sig. A teaspoonful every two or three hours.

Rhus Tox.—Where the child is restless and there is a sharp stroke to the pulse, and the child startles at the slightest sounds, or, if asleep, wakens with a sharp cry, ten drops of specific *rhus* to a half a glass of water, and a teaspoonful every hour, will be found an efficient agent.

A *saline* cathartic and a hot foot-bath will materially assist the above medication.

In passive hyperemia, where possible, remove the cause of the obstruction, and the hyperemia will disappear. If the congestion be not due to pressure upon the veins, specific *belladonna* will be the specific that will give relief. Ten drops of the agent to four ounces of water, and a teaspoonful every hour, will not disappoint.

CEREBRAL ANEMIA.

Definition.—An insufficient amount of blood circulating in the capillaries.

Etiology.—This may be due to general or local causes. Thus cerebral anemia may attend the general anemia coming from a severe hemorrhage or from profuse diarrhea, or from pernicious anemia, leukemia, and various cachexias, or it may be due to the accumulation of a large quantity of blood in the peritoneal cavity following the removal of ascitic fluid. A more serious condition would be anemia due to aortic stenosis. Among local causes may be mentioned obliterative endarteritis, compression of the brain from tumors, or a partial destruction of the circle of Willis.

Pathology.—The puncta vasculosa are so lessened many times as to escape detection, while there may be an increase in the cerebro-spinal fluid. The gray matter assumes a characteristic pallor.

Symptoms.—These are due to profuse, exhausting, diarrheal discharges, and, especially where due to hemorrhage, the symptoms are characteristic; there is dizziness, faintness, pallor of face, ringing in the ears, confusion of ideas, and marked dyspnea, and frequently terminating in a "dead faint." Where the anemia is sudden and intense, the syncopal attack may terminate fatally.

Where the anemia is more chronic in character, there is pallor of face, the skin is cool, and the pulse is feeble and irritable. The patient is listless and stupid, though we may meet cases with general irritability. There is a dull headache, vertigo, buzzing in the ears, spots before the eyes, and weakness of the muscles.

The hydrocephaloid symptoms, occurring in young children, so named by Marshal Hall, are pallor, dullness, contracted pupils, and depressed fontanels.

Treatment.—This will depend upon the cause giving rise to it. Where the attack is acute and sudden, the patient should be placed in the recumbent position, with the head depressed. A diffuse stimulant, like ammonium carbonate, gives prompt results. In severe cases, where there has been excessive hemorrhage, a subcutaneous injection of normal saline solution should be used. In the more chronic form, and when secondary, the treatment suggested for general anemia will be followed with nourishing food and gentle exercise in the open air.

CEREBRAL HEMORRHAGE.

Synonym.—Apoplexy.

Definition.—Hemorrhage in the brain or its meninges, usually from the arteries and capillaries, though occasionally from the veins.

Etiology.—Eighty per cent of cerebral hemorrhages occur after the age of forty, though it has taken place in a child of nine. It is more frequent in men than women, no doubt from greater dissipations and more severe physical exertions of the former,

which tend to diseases of the blood-vessels. A feeble condition of the cerebral vessels, due to disease of their walls, is essential for



FIG. 48. Circle of Willis and Arteries of Brain (*Deaver*). (*Tyson*.)

the lesion, when a variety of causes may be responsible for the accident.

In certain families there is a tendency to degeneration of the arteries, hence *heredity* must figure as a predisposing cause. A

large number of cases are preceded by some lesion of the heart. It may be endocarditis with its accompanying hypertrophy, especially where the hemorrhage occurs in young persons, or it may be due to endarteritis or atheromatous condition of the vessels; again, it may be due to rupture of small aneurisms (miliary) of the branches of the cerebral arteries.

Another common condition is nephritis and diabetes, while alcohol, syphilis, rheumatism, and gout are not infrequent factors in the case. Certain infectious diseases, especially ulcerative endocarditis and diphtheria, may be mentioned, while leukemia and anemia are not to be overlooked as causal conditions.

Pathology.—While any part of the brain may be the seat of hemorrhage, the most frequent site is the base in the neighborhood of the corpus striatum and optic thalamus, since their chief supply comes from the branches of the cerebral artery. The majority of the severe hemorrhages of the brain occur in the internal capsule and lenticular nucleus, by the rupture of the lenticulo-striate artery; so frequently is this artery ruptured that Charcot has termed it the "artery of cerebral hemorrhage."

"Under different circumstances the blood effused may be small in quantity, or amount to several ounces. In the latter case it tears up the brain-tissue, destroying, for instance, the great ganglia, and the internal capsule, and extending thence into the centrum ovale; or it may burst through the optic thalamus or caudate nucleus into the lateral ventricle. Thence the blood flows by the aqueduct of Sylvius into the fourth ventricle. Such cases are rapidly fatal, and *post-mortem* examination reveals a mass of black clot, filling the ventricle, and occupying much of the hemisphere, surrounded by brain-tissue, which is ragged and discolored by blood. The pressure exerted by the clot is shown by one, or even both, hemispheres being enlarged, with flattened convolutions and closed sulci. In cases which have lasted a few days, there is the same black-red clot, and the brain-tissue around is soft and discolored yellow, from absorption of hemoglobin. In later stages, the clot becomes brown, or brownish-yellow, consisting of disintegrated blood and nerve-tissue; and the surrounding tissue is frequently softened (white softening), and contains granule-corpuscles. Finally, in patients that survive, the blood becomes absorbed, and leaves a tawny or orange-colored spot, in which crystals of hematoidin can be found; or a cyst may

remain, containing serous fluid; or a distinct, tough, fibrous scar, discolored also by the remains of blood-pigment.

"Secondary Degeneration.—Permanent lesions of the pyramidal tract, or of the cortical motor area, are followed by descending secondary degenerations, like those which occur in disease of the spinal cord. Such degenerations follow the course of the pyramidal fibers below the lesion; thus, a lesion of the internal capsule (and it is to be observed that lesions of the corpus striatum and optic thalamus alone are not followed by secondary degeneration) causes this change to take place in the middle third of the crus cerebri, in the anterior part of the pons, in the pyramid of the medulla oblongata on the same side, in the column of Türck, also on the same side, but in the posterior part of the lateral column of the spinal cord for its whole length on the opposite side." (Taylor.)

Symptoms.—Although unusual, premonitory symptoms may be present, and consist of headache, more or less dullness, ringing in the ears, vertigo, and sometimes choreiform movements. There also may be motor impairment, as seen in the slow step or movement of the arm.

Generally, with the rupture of the vessel, comes the *apoplectic* stroke or *apoplectic shock*, and the patient drops unconscious on the ground. The face is dusky or ashen gray; the pulse, at first small, soon becomes full, slow, and of increased tension; the breathing is noisy, stertorous, and the cheek is blown out at each expiration. Sometimes there is the Cheyne-Stoke respiration.

There is usually complete relaxation on the paralyzed side, though there may be twitching of the muscles or slight convulsive movements for a time. Soon, however, these cease, and there is present the characteristic flaccidity and loss of muscular control. This may be seen by lifting the affected member, when it drops heavily to one side.

The pupils vary, usually dilated, though when the hemorrhage is in the pons or ventricles, irritating the nucleus of the third nerve, the pupils are contracted. The temperature is not, infrequently, slightly subnormal, though when the hemorrhage is of the base of the brain, there is apt to be a high temperature. There is loss of control of the sphincters, and the feces and urine are passed involuntarily.

Where the disease does not terminate fatally in twenty-four

or forty-eight hours, the breathing becomes less labored, and the patient gradually regains consciousness. The eye is turned towards the affected side or away from the paralyzed side. Hemiplegia, paralysis of one entire side, is the rule.

Sometimes the symptoms come on gradually, when it is termed *ingravescent apoplexy*. Here the patient feels dull, there is heaviness in the head, moves slowly and with difficulty, and it is several hours before the patient loses consciousness and the loss of voluntary motion, and sometimes consciousness is retained till after the paralysis appears, or, with the onset of motor paralysis, the patient is assisted to bed, drops asleep, and passes into a comatose condition, the failure to waken the patient being the warning note of his true condition.

The evidence of hemiplegia, before consciousness returns, may be overlooked; but if we note carefully the face, we will notice a slight dropping of the angles of the mouth on the affected side, and the muscles of the extremities are flaccid and baggy. In rare cases the muscles are *rigid* on the affected side.

Although the tongue may not be paralyzed, it goes to the affected side when protruded. When it is paralyzed there is great difficulty in articulation.

Sensation may be but slightly impaired, and only for the first few days, but early disappears.

Although the *tendon reflexes* are generally *abolished* in the early stage, they are nearly always increased on the affected side later in the disease. A continued failure in the reflexes should be regarded as an unfavorable sign.

Trophic symptoms are seen in an increased temperature, puffiness of the eyelids and hands, coolness and moisture of the feet, and, in some cases, rapid necrosis and gangrene of the tissues over the sacrum, the "*acute malignant decubitus*" of Charcot.

General nutrition is usually maintained, though, in rare cases, there is general atrophy.

Where partial recovery takes place, the mental faculties, as a rule, remain unimpaired.

Diagnosis.—The diagnosis is many times extremely difficult and often it is impossible to differentiate between cerebral hemorrhage, embolism and thrombosis. Care must also be observed, or it may be mistaken for diabetic coma, uremic poisoning, epilepsy, opium poisoning, or alcoholism.

The most characteristic signs of apoplexy are sudden *unconsciousness*, deep, heavy *stertorous* breathing, a full oppressed pulse, and *hemiplegia*, which can be determined, even during unconsciousness, by the flaccidity of the muscles.

FIG. 49. The motor tract (Starr): *S*, fissure of Sylvius; *NL*, lenticular nucleus; *OT*, optic thalamus; *NC*, caudate nucleus; *C*, crus; *P*, pons; *M*, medulla; *O*, olivary body. The tracts for face, arms, and legs gather from the lower, middle, and upper thirds of the motor area, pass into the capsule, and through the crus and pons, where the face-fibers cross to the opposite VII. N. nucleus, while the others pass on to the lower medulla, where they partially decussate to enter the lateral column of the cord, the non-decussating fibers passing into the ant. median columns. Lesion in cortex causes monoplegia; in capsule, hemiplegia; in pons, alternating paralysis. (*Lockwood.*)

In a case of drunk, the patient can usually be aroused if only for a moment, and the breathing is *not stertorous*; the breath may be of but little significance, for apoplexy frequently occurs among alcoholics. In epilepsy there is generally the telltale frothing at the mouth, and a history of previous attacks. In

uremic coma, the urine should be examined for albumin and casts, and for sugar in diabetic coma. Opium poisoning comes on slowly, and the patient can usually be aroused if but for a moment, and the breathing, while slow and labored, does not give the characteristic stertor. The head should be examined carefully for injuries, that concussion of the brain may be excluded.

Prognosis.—This depends largely upon the location and extent of the lesion. Unless the hemorrhage is severe in the pons, death is not likely to occur suddenly. Usually, where the hemorrhage is extensive, the patient will live ten, twelve, or more hours. Where slight, the patient may recover within a few weeks. Should the patient fail to show improvement in three months, the outlook is unfavorable.

The muscles of the face are the first to show improvement; then the patient will be able to move the toes, and later the limbs may be flexed, till finally he can step and bear his weight. At first his feet seem too heavy to lift, the patient shuffling or dragging the foot, though in time there may be but little use of a cane. The muscles of the hand respond slowly, and complete recovery may not take place, the hand being puffy, bluish, and cold.

Where the coma deepens the second or third day after the attack, or the temperature rapidly increases within the first forty-eight hours, the prognosis is decidedly unfavorable.

Treatment.—The clothing about the neck should be loosened, and the head slightly elevated. If the pulse be *full* and *strong*, veratrum should be given in full doses, say one dram to four ounces of water, and a teaspoonful given every one, two, or three hours. A brisk cathartic should be given early. Sinapisms may be applied to the spine, hot applications to the feet, and the head sponged with hot water, while an assistant uses the fan. Some prefer the ice-bag to the head.

When consciousness returns, the patient should be kept perfectly quiet, all efforts at conversation prohibited for a few days, and liquid nourishment given.

Where the capillary circulation is feeble, belladonna will be found useful. Massage and electricity will be found efficient in restoring tone to the muscles during convalescence.

EMBOLISM AND THROMBOSIS.

Synonym.—Cerebral Softening.

EMBOLISM.

Definition.—The obstruction of the cerebral arteries or capillaries by material (embolus) floated, by the blood-stream, from some distant part.

Etiology.—Nearly ninety per cent of all cases of embolism occur as the result of valvular disease of the left heart. It may be a vegetation of an acute endocarditis, though more frequently the result of chronic inflammation of the valves or the ulceration of their segments. In rarer cases it occurs from a portion of a clot from the auricle, from aneurism or atheroma of the aorta, or from the great vessels of the neck or of the lungs.

In certain infectious diseases, as pneumonia, diphtheria, puerperal fever, septicemia, and kindred affections, heart-clots may form and portions be washed into the cerebral vessels, giving rise to embolism. Since the embolus more frequently enters the left carotid, the left middle cerebral artery is most often the seat of the disease.

The lesion occurs more frequently among young adults, and in females, than in males.

THROMBOSIS.

Definition.—Clotting of blood in the cerebral arteries, veins, or sinuses.

Etiology.—This is most frequently due to disease of the walls of the blood-vessels, whereby their surface is roughened, favoring the deposit of fibrin. This may arise from endarteritis, atheroma, or syphilitic endarteritis, or from weakening of the circulation from diphtheria, typhoid fever, tuberculosis, cancer, and such diseases as impair the integrity of the blood. It may result from aneurisms, and it has followed the ligation of the carotid artery. In fact any condition that affects the vessel wall, or obstructs the blood-current, or increases its coagulability, is a possible cause of thrombosis. The thrombosis occurs most frequently in the middle cerebral and in the basilar arteries.

Pathology.—Taylor thus describes the anatomical changes:

"Embolism and thrombosis, by obstructing the circulation of the blood, alike lead to *softening* of the districts of the brain to which the vessels correspond, unless the vascular supply is maintained by means of anastomoses. These are not abundant in the case of the cerebral vessels, and, indeed, the vessels going to the central ganglia are really terminal vessels, while those going to the cortex of the brain do anastomose more or less. At least, this is true of the distribution of the middle cerebral artery—the vessel most often obstructed. A part of the brain in which softening has taken place has generally lost the smooth, glistening surface of a normal brain-section, is more opaque, or gray, or speckled; it breaks down readily under a stream of water; or it is milky, or diffuent. It shows under the microscope drops of myelin, portions of nerve-fibers, granule-corpuscles, and free fat-globules. It sometimes has a yellowish or brownish color from blood-pigment; or minute extravasations may be present in cases of sudden obstruction, and a form of *red softening* results. In cases of rapid death after embolism, the brain substance may look perfectly healthy, as there has not been time for any changes visible to the naked eye to take place. Occasionally an embolus sets up inflammatory changes in its neighborhood; sometimes it leads to aneurysm and cerebral hemorrhage. Rarely actual infarcts are formed. The later stages of softening consist in the absorption of the disintegrated tissue, and the formation of a cyst; or, if the softening is small, a cicatrix may be produced.

"Embolic lesions, involving the motor tract, are followed by the same secondary changes (descending sclerosis) as are hemorrhagic lesions. A persistent lesion of the brain, whether embolic or hemorrhagic, causing hemiplegia in infancy or early childhood, has the remarkable effect of checking the growth of one-half of the brain, or it may be of other parts of the central organs, so that years after it is smaller than the other half, and is described as atrophied (*cerebral hemiatrophy, unilateral atrophy*). If the lesion is in the motor cortex, the hemisphere is atrophied on that side, and there is sclerosis of the pyramidal tract; if it is in the basal ganglia, there is in addition atrophy of the middle fillet in the pons medulla, and of the antero-lateral region of the spinal cord on the *same* side; and atrophy of the cerebellum, superior cerebellar peduncle and dentate nucleus on the *opposite* side (Mott and Tredgold)."

Symptoms.—Naturally, the symptoms will depend upon the location and extent of the lesion. They may be so slight as to escape detection, and only be discovered during an autopsy, or they may be so severe as to destroy life in a few hours. The shock from cerebral embolism may be so similar to cerebral hemorrhage as to be almost indistinguishable.

A very important factor in determining the symptoms is whether the embolism be in a small artery or in a large one, and if it be located in the hemispheres or toward the base of the brain.

In embolism, the onset is almost invariably sudden, there being no premonitory symptoms, the patient suddenly losing consciousness. Usually this is not so severe as in cerebral hemorrhage, and the patient soon regains consciousness, though, when very severe, coma becomes pronounced, and the case terminates fatally. Convulsions may occur when the motor regions are involved.

If the *anterior cerebral* is the vessel involved, the symptoms are often negative, since branches of the middle cerebral will supply about the same area. Apathy and dullness are sometimes present.

When the *middle cerebral* is involved, the one most frequently affected, hemiplegia follows, and is permanent or transient according to the location of the plug. Thus if the vessel be blocked before the central arteries are given off, it is permanent, while if beyond this point, the arm and face suffer, but it is generally temporary.

If the left side be involved, there is aphasia. If the trunk be spared and the branches are involved, the symptoms will vary according to the part affected. These branches supply the inferior frontal, the anterior and posterior central gyri, the supramarginal, angular, and temporal gyri.

The different types of aphasia are thus explained: *Motor or ataxic aphasia*, when the patient remembers the words, but can not articulate them: here the lesion is in the third left frontal convolution. *Sensory aphasia*, where the patient fails to comprehend the meaning of spoken words (word-deafness), is due to lesions of the first and second temporo-sphenoidal convolutions. If the angular gyrus be involved, *word-blindness* follows.

The *posterior cerebral* vessels supply the occipital and temporo-sphenoidal lobes, and when involved—a rare case—there is

hemianesthesia due to softening of the internal capsule, and hemianopsia due to softening of the cuneus. Sometimes there is complete loss of sight, though, generally, but temporary.

Involvement of the Internal Carotid.—If the circulation be by the communicating vessels of the circle of Willis, there will be an absence of symptoms; but if these vessels are small or absent, the circulation is arrested, and permanent paraplegia and death are apt to follow in a few days.

Basilar Artery.—Where this is occluded, bilateral paralysis, from involvement of both motor tracts, is apt to follow. In these cases the temperature rapidly rises to 107° , 108° or 109° , or even higher, the pulse is rapid and irregular, and convulsions may occur. Bulbar symptoms are frequently present.

Vertebral Artery.—The left is the more frequently involved, and usually in connection with the basilar. The nuclei in the medulla are affected, and attended by symptoms of acute bulbar paralysis.

Cerebellar Arteries.—Inco-ordinations of movement have been recorded as a result of cerebellar softening, though the lesion is rare.

Thrombosis, though not so rapid in its development, is followed by the same results, apoplexy and hemiplegia. The disease comes on more gradually; there is frequent and persistent headache, more or less dizziness, a gradual loss of the mental powers, and a perverted sensibility manifested by a numb, tingling, or creeping sensation in arm or leg. These symptoms, especially in elderly people, gradually increase till the mental faculties are destroyed, and we have the "softening of the brain" of old people.

Diagnosis.—It is sometimes almost impossible to differentiate between embolism and cerebral hemorrhage during the first few days; generally, however, they can be recognized by the following conditions: A history of rheumatism or endocarditis usually precedes embolism. Unconsciousness is not so prolonged nor coma so marked. The face is pale, not flushed, nor is there stertorous breathing.

Thrombosis comes on gradually, preceded by dizziness, headache, and perverted sensibility.

Prognosis.—The prognosis from embolism is slightly more favorable than from hemorrhage; the location is also a determin-

ing factor in the recovery. Paralysis is more apt to be permanent in embolism. In thrombosis, cerebral softening frequently follows, the prognosis in such cases being unfavorable.

Treatment.—In the administration of remedies we will be guided entirely by the conditions present. The immediate treatment will be rest in bed, and, if shock be present, stimulants administered. Later, in those cases where irritation occurs, sedative agents will be used. The antisyphilitics will be used where the lesion has been preceded by syphilis.

In cerebral softening, but little can be done save improving the general health. Hygienic and dietetic measures will be an important part of the treatment.

APHASIA.

Definition.—Aphasia is that condition due to cerebral lesions, whereby there is an inability to comprehend words properly and use them correctly, or a total suppression of the power of speech. It must not be confused with—

- (1) Anarthria, a defect of articulation due to lesions of the medulla oblongata (bulbar paralysis).
- (2) Mental aberrations independent of demonstrable lesions of the cerebral centers.

The language or speech centers are found in the third or inferior *left* frontal convolution (Broca's convolution), and when associated with hemiplegia—and it is in most cases—it is with a *right* hemiplegia.

There are various phases and degrees of aphasia, according to the extent of the lesion and the center involved; thus a patient may be able to say only one or two words, as yes or no, and repeats these to every question, or he may not be able to speak a single word. Others have a larger vocabulary, but are unconscious of the *fitness* of words to express their ideas, while others recognize their unfitness *after* speaking.

“One may be unable (a) to *hear* words spoken; (b) to *understand* words *spoken*; (c) to *see* words written and printed; (d) to *understand* words *written* and *printed*; (e) to *speak* from memory; (f) to *repeat* words; (g) to *read aloud*, i. e., to *speak* from sight; (h) to *write* from memory; (i) to *write* from dictation,

i. e., from words heard; (k) to write from a copy, *i. e.*, from words seen."

"Speech not only depends upon perfect co-ordinating and motor processes, but also upon the senses of hearing and sight. In aphasia therefore certain centers are involved, and are as follows: (1) The auditory speech center, in the upper extremity of

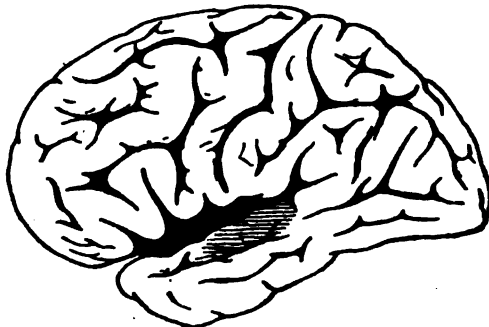


FIG. 50. Situation of lesion in the first left temporal convolution, causing Word-deafness. (After Charcot.)

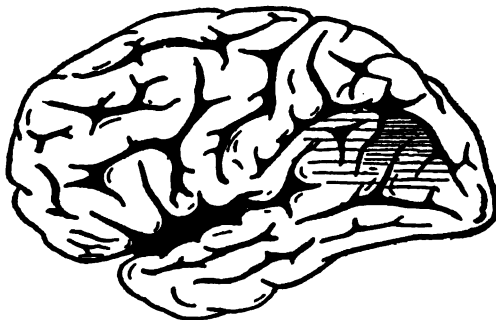


FIG. 51. Situation of lesion causing Word-blindness. (After Charcot.)

the left temporo-sphenoidal convolutions; (2) The visual-speech center, in the left angular gyrus and supra-marginal gyrus; (3) The motor-speech center, in the posterior part of the third left frontal convolution, or Broca's convolution; (4) The motor-writing center, probably in the posterior part of the second left frontal convolution, related to the muscles of the hand; (5) Commissural fibers between these."

Lesions of the first four centers of the commissural fibers between them will cause some form of aphasia or agraphia.

Where the motor-speech center is destroyed there is *motor aphasia*, and where the visual-speech center is involved there is *sensory aphasia*, and an involvement of two or more centers gives rise to the various combinations of aphasia.

FIG. 52. Situation of the lesion in the case of Motor Aphasia.
C. Ascending frontal convolution. F³. Third frontal convolution. P. Ascending parietal convolution.
(After Charcot.)

FIG. 53. Situation of lesion in the case of Agraphia. (After Charcot.)

Etiology.—Since almost the entire cerebral centers for language are in the cortex or immediately beneath it, any organic or functional disease that interferes with this portion of the brain is a cause of aphasia.

The most common causes are embolism and thrombosis, with their consequent softening. Hemorrhage is also a not infrequent

cause. Severe congestion, without hemorrhage or softening, may give rise to a more transient aphasia. Trauma, as fractures of the skull; meningitis by impairing the cortex; degenerative diseases, and toxemias form cerebral abscesses; or the severe infectious diseases, may also be responsible for aphasia.

Symptoms.—*Motor Aphasia.*—The inability to articulate, or even gesture, usually comes on suddenly, and at first may be complete, though a limited power is usually retained or early regained. The patient may be able to say only one or two syllables or words, and repeats them on all occasions regardless of their propriety. Sometimes it will be an exclamatory oath, used automatically. Sometimes the words will consist of some part of a sentence that he was about to utter just before the attack rendered him speechless.

His sensory centers being unimpaired, he can understand what is said to him and appreciate his own errors, but is unable to correct them.

His ability to write is also affected (*agraphia*), and he finds it impossible to write even the few words that he can articulate, though he may be able to sign his name. Along with this inability to articulate and write there is frequently lost the power of understanding printed or written words.

Sensory Aphasia.—In this form there is a disturbance of the auditory and visual speech centers; *word-deafness* in lesion of the auditory speech-center, and *word-blindness* in lesion of the visual speech-center.

In word-deafness, while the patient can hear ordinary sounds, he is unable to recognize and understand spoken words, and can not repeat words or write from dictation.

In word-blindness the patient can not see or understand words printed or written, can not read aloud, and can not write spontaneously from dictation or copy, as writing is simulated directly from the visual center, but he may be able to talk well.

Two other conditions may be associated with sensory aphasia: *mind-deafness*, or inability to recognize the meaning of any kind of sound; and *mind-blindness*, or inability to recognize the meaning or use of any kind of object.

Prognosis.—This depends largely upon the cause and extent of the lesion. Where it is functional, and due to congestion, in-

flammation, or toxemia, the aphasia is transient and disappears with a correction of the exciting cause.

If in children, although the speech centers be destroyed, patient and persistent instruction may result in the education of the speech centers in the opposite hemispheres. If due to tumors, bone-pressure, or abscess, relief may follow operative measures.

Treatment.—Save in functional aphasia, but little may be expected from medication.

When due to pressure from any source, the only promise of relief is at the hands of the surgeon. For special instruction in developing speech centers, one should consult those who make it their life-work.

ENCEPHALITIS.

Definition.—This, in the true sense, is an inflammation of the brain-tissue, a cerebritis, and usually, if not always, implies an inflammation of the meninges as well, the symptoms of which are those of meningitis aggravated or intensified. Encephalitis, as now *generally used*, is a synonym for abscess of the brain—Suppuration Encephalitis.

ABSCESS OF THE BRAIN.

Etiology.—This lesion is usually found between the ages of twenty and forty, and more frequently in males than in females. It is generally, if not always, secondary, and may arise from an extension of suppurative inflammation of the ear, nose, or orbit, especially where the bones are involved; from head injuries as fracture of the skull, or from a punctured wound; from pyemia, septicemia, gangrene of the lung, ulcerative endocarditis, and necrosis of bones; from intercranial tumors, and from the specific infectious fevers. It is more apt to occur among the poorer classes, especially where due to middle-ear diseases following scarlet fever, and where the child has not had the proper care.

Pathology.—The abscess varies as to size and character of its contents. It may be single or multiple, usually the former. Pus of varying consistency, blood, and pyogenic organisms make up its contents. It is most frequently found in the temporo-sphe-

noidal lobe, owing to its relation to the middle ear. It is rarely found in the cerebellum, and still less so in the pons and medulla. The neighboring brain-substance is generally softened and reveals the change due to inflammation. Where of long standing, a thick layer of fibrous tissue is found walling off the abscess.

Symptoms.—These vary, according to size, location, cause, and character of the inflammation. Where there are severe complications, as head injuries or meningitis, the symptoms may be so masked as to escape detection. They may appear quite rapidly, or come on insidiously. Where acute, the symptoms are of acute septic infection; there is a chill, followed by rise of temperature, intense headache, vertigo, vomiting, mental dullness, or delirium and convulsions.

When it comes on slowly, being secondary to septicemia or ulcerative endocarditis, in addition to symptoms of the primary lesions, there will be chills, irregular fever, sometimes the temperature being subnormal, nausea, vomiting, headache, and convulsions. The motor and sensory symptoms depend upon the extent and location of the abscess. There may be aphasia, hemiplegia, clonic spasms, or hemianopsia. The reflexes are generally much exaggerated. Choked disks are rare, though congestion of the eye-grounds is common. Respiration is usually slow, from ten to fifteen per minute, while the Cheyne-Stokes respiration is sometimes observed.

In rare cases the abscess ruptures into the ear or nose, and relief is experienced by drainage from those channels. If the abscess be in the "silent regions," and small in size, the symptoms may be so slight as to escape detection.

Diagnosis.—In acute cases preceded by head injuries, there will be but little difficulty in determining the lesion. With a history of injury followed by intense headache, fever, delirium, optic neuritis, and convulsions, the diagnosis would be easy. In the more chronic cases, an accurate history and a careful examination of the patient should be made for endocarditis, septic lung lesions, bone necrosis, etc., and should these be followed by irregular fever, nausea, vomiting, headache, coma, convulsions, motor and sensory symptoms, such as aphasia, hemiplegia, etc., the diagnosis should not be difficult.

Prognosis.—This is always grave, though if free drainage be secured, either by spontaneous rupture into the nasal or aural

opening, or by surgical measures, the patient will frequently recover.

Treatment.—Though the antiseptics would be indicated in all cases of sepsis, the treatment is surgical, and consists of early evacuation and thorough drainage.

HYDROCEPHALUS.

Synonym.—Dropsy of the Brain.

Definition.—An accumulation of fluid within the ventricles or subarachnoid spaces of the brain.

Etiology.—Hydrocephalus may be either congenital or acquired. Although heredity has been assigned as influencing the congenital form, several children in a family being affected, the true cause is unknown. The acquired form may result from some impairment of the circulation in the straight sinus, from brain tumor, or from meningitis.

In the congenital form, the enlargement may be so marked as to render labor extremely difficult, and sometimes necessitate craniotomy.

Pathology.—In the congenital form, the head is noticed to be unusually large at birth, or very soon develops after coming into the world. The fontanels are bulging and the sutures separated. On opening the skull, the bones are found to be thin, the dura usually unchanged, though it may be thickened, while the brain-substance is slightly softened. The ventricles, especially the lateral, may be enormously distended, while the third and fourth show less disturbance.

The endyma may be thickened and slightly roughened, or it may remain unchanged. Where the child survives a few years, the sutures are closed by Wormian bones. Sometimes the head reaches an enormous size.

In the acquired form, the head does not show such marked enlargement, and the ventricles are but moderately distended. The brain shows some softening.

Symptoms.—In congenital hydrocephalus the most striking feature is the large head, with sutures separated and fontanels open and bulging. As the head enlarges, the face appears un-

usually small, and the eyes, owing to the pressure, are peculiarly prominent. The child is unable to walk, and is soon unable even to sit up and support the great weight of the head. The child lies upon its back with the limbs flexed. Convulsions are quite common. The intellect is generally impaired, or slow in development. In rare cases the intellect is well preserved. The child is generally listless and dull. Nutrition is more or less disturbed, and the puny body bears a striking contrast to the enormously developed head. Fortunately these children do not often survive childhood, though a rare case reaches maturity.

In the acquired form, there may be headache, dimness of the sight, progressive optic neuritis, and irregular gait.

Diagnosis.—There is generally no difficulty in diagnosing a case of congenital hydrocephalus. The picture is so characteristic that it is difficult to make a mistake. In the acquired form the symptoms may be obscured and the diagnosis rendered more difficult.

Prognosis.—A child rarely lives much beyond the fifth year, though he may survive till adult years are reached.

Treatment.—Medication offers but little encouragement in hydrocephalus, and operative measures have not brought brilliant results and are always attended by considerable danger.

CEREBRAL PALSIES OF CHILDHOOD.

Synonym.—Infantile Cerebral Paralysis.

Definition.—This includes two varieties: one which is noticed at birth, hence is termed *birth-palsy*, and usually involves both legs and arms; and one which takes place during the first two or three years of life, and is generally hemiplegic.

BIRTH-PALSY.

Etiology.—This occurs most frequently in premature births and in difficult labors, especially in instrumental deliveries, and which are attended by meningeal hemorrhage.

Abnormal conditions during intra-uterine life, not readily ac-

counted for, may be responsible for this condition. Syphilis, heredity, shock, and great mental excitement may have some etiological significance.

Pathology.—The most constant lesion is the meningeal hemorrhage, which impairs the cerebral cortex, affecting various brain centers. Thus where the pressure takes place in the third frontal convolution, the speech centers are involved, and when the center controlling the eye movement is involved, the child squints.

Where forces have been at work prior to birth, and therefore are not mechanical, a loss of cerebral substances takes place, *porencephalous* cysts sometimes replacing the brain-tissue.

Symptoms.—Even at birth, rigidity of the muscles may be noticed, while attempting to dress the infant, or it may not develop for some weeks, when the legs are inclined to cross. In other cases nothing unusual is noticed until the child attempts to walk or use its hands. The intellect is usually feeble, especially when the cause is due to loss of cerebral substances.

When the child attempts to stand, the weight is thrown upon the inner side of the feet, the knees are placed together or even crossed, and if able to walk, only one foot is advanced, the other being dragged after its fellow. Choreiform movements and various grades of spasmodic inco-ordination are seen, and convulsions are not uncommon. Sensation is generally normal, though the *reflexes* are increased.

Diagnosis.—The rigidity of the limbs, the choreiform movements and spasmodic inco-ordination of the muscles, the peculiar position of the feet and limbs on standing, and the unnatural gait on attempting to walk, together with deficient intellectual features, render the diagnosis comparatively easy.

Prognosis.—This depends, to some extent, upon the mental condition and the degree of paralysis, though the prognosis is grave in all cases.

Treatment.—In addition to hygienic and dietetic measures to improve the general health, massage, and faradization should be given a thorough trial. A careful and systematic course of training should be carried on as long as there is the least encouragement. The medication will be entirely symptomatic.

INFANTILE HEMIPLEGIA.

Etiology.—Although cerebral traumatism and the infectious fevers have been regarded by some as being responsible for this condition, the specific cause is unknown. Some cases are congenital, though a very large majority of cases develop during the first three or four years of life.

Pathology.—In the majority of cases, the nature of the primary lesion is unknown. In an analysis of ninety autopsies made from the literature on this subject, Osler found the following:

(a) In sixteen cases there was embolism, thrombosis, or hemorrhage. In seven of these a Sylvian artery was occluded; in nine there was hemorrhage. It is interesting to know that in ten of these cases the disease set in in children over six years of age.

(b) Atrophy and sclerosis, which are the common conditions in the majority of cases. The wasting is either of groups of convolutions, an entire lobe, or one hemisphere. The meninges may look normal, though more commonly they are tightly adherent and the brain-substance tears. The convolutions are shrunken, firm, and hard. In some instances there is a remarkable unilateral atrophy, in which the brain-tissue is a mere shell over the greatly dilated ventricle. Thus, in one of my cases, the atrophied hemisphere weighed 169 grammes and the normal 553 grammes.

(c) Porencephalus was present in twenty-four of the ninety autopsies. This term was applied by Heschl to a loss of substance in the form of cavities or cysts at the surface of the brain communicating with the arachnoid space, and in some cases passing deeply into the hemisphere, reaching even to the ventricle. Of 103 cases of porencephalus analyzed by Audry, hemiplegia was present in 68. (Pepper's "Practice.")

Symptoms.—The onset is not infrequently attended by general malaise and slight fever, the temperature rarely exceeding 102°. This is followed in twenty-four or forty-eight hours by convulsions, generally on the side which is afterwards paralyzed. The convulsions may occur at slight intervals, the patient losing consciousness.

Many times the disease comes on suddenly without a single premonitory symptom, the patient suddenly becoming unconscious, and on the return to consciousness it is found that the

child is paralyzed, the right side being the most frequently involved and the arm more seriously than the leg. Atrophy of the muscles, especially of the arm, is quite marked.

Epilepsy is a frequent result, especially when the hemiplegia is from birth.

Generally there is *arrested* or retarded mental development, and idiots or imbeciles are not uncommon among this class of unfortunates.

The knee-jerk and ankle clonus may be present.

Post-hemiplegic movements consist of tremors, choreiform movements, and athetosis.

Diagnosis.—This is readily made from the characteristic symptoms that accompany hemiplegia.

Prognosis.—As regards life, the prognosis is good, though mental impairment and some degree of paralysis remain. Aphasia is rarely ever permanent.

Treatment.—Aside from the treatment for the convulsions, and these should be controlled as soon as possible, the treatment will be symptomatic, and means and methods used for improving the general health.

A nutritious and easily digested diet, plenty of fresh air and sunshine, massage and faradization, and patient and systematic education, will be important factors in the treatment.

IV. DISEASES OF UNKNOWN PATHOLOGY.

EPILEPSY.

Synonym.—Falling Sickness.

Definition.—A condition in which there is a sudden, though temporary, loss of consciousness, with or without convulsions. When the attack is but momentary and without convulsions, or with but slight tremors, it is termed *petit mal*. Where the attack is severe, unconsciousness is prolonged, and there is severe general convulsions, it is known as *grand mal*.

Etiology.—The causes may be properly divided into predisposing and exciting.

Predisposing.—*Heredity*, according to Féré, is a strong predisposing factor, in that a marked neurotic taint is to be found in the lineage of epileptics. Not that there is a direct transmission from parent to child, for this is rare, but where not due to pressure, a history of insanity, hysteria, paralysis, insomnia, suicide, chorea, puerperal eclampsia, and other vices of the nervous system can be traced to one or both parents.

Consanguinity has been considered by some as favoring epilepsy, but in all probability such cases were coincidences rather than predisposing factors.

Age.—One-third of the cases occur before the thirteenth year, two-thirds before the nineteenth year, and the remaining third before the thirtieth year.

Alcoholism.—The fact that nearly one-half of all epileptics recorded are children of parents addicted to drink, is a significant factor.

Scarlet Fever and Puerperal Eclampsia.—Gowers states that scarlet fever is the disease that is most frequently followed by epilepsy, while Féré has observed epilepsy following puerperal eclampsia. All these conditions, however, only prepare the soil for some one of the many exciting causes.

Exciting Causes.—Favorable conditions being present, a variety of exciting causes may precipitate an attack. Thus traumas, syphilitic neoplasms in brain or cord, meningeal irritation, great emotion, nervous shock, acute alcoholism, toxic substances in the blood, an overloaded stomach, masturbation, an elongated or adherent prepuce, an adherent clitoris, scar tissue in the uterine cervix, teething, intestinal parasites, etc., may be mentioned.

One peculiar feature of the disease is that the epileptic habit having once been firmly established, the disease is prone to continue, even though the cause is seemingly removed.

Pathology.—There is no characteristic pathological condition found that is constant. In some there will be organic changes, such as tumors, meningeal changes, pressure from bone, or from syphilitic deposits, and other demonstrable wrongs; but these same conditions may be present in patients that never suffer from epileptic seizures. Of the idiopathic variety no pathological wrongs can be found. When due to reflex causes, tissue changes are frequently present at the source of irritation, as of the rectum, uterine cervix, urethra, ovary, perineum, etc.

Chaslin claims to have found a characteristic non-inflammatory degeneration, in which the neuroglia of the brain is transformed into an abnormal tissue, and that this degeneration is a result of a vice in development. The finding of this degeneration in all cases, however, has not been corroborated.

Symptoms.—*Grand Mal.*—Prodromal symptoms, or aura, frequently occur in this form, and may last but a few moments or occur a few days before the onset of an attack. Where of long duration, the patient becomes morose, cross, sullen, irritable, or melancholy. Where brief, it may be a sense of fear, an idea of impending danger, or there may be flashes of light, or loss of hearing, or a perverted hearing, such as whistling, buzzing, musical sounds, or hissing; again, disagreeable odors, or a peculiar taste; or there may be discomfort in the epigastric region; sometimes it takes the form of numbness or tingling in the extremities, as the foot or hand, gradually extending to the head. Whether or not the attack is preceded by aura, the *attack* is sudden.

The Attack.—A sudden pallor of the face, a frightened look, followed by a wild piercing scream, known as the *epileptic cry*, and the patient falls unconscious in the throes of a convulsion. Many times there is not a sound or warning symptom, the patient falling unconscious in a spasm.

With the first unconsciousness, tonic spasms come on, and all the muscles of the body are in a tetanic rigidity. The face is congested and distorted by the facial spasm, the head thrown backward or rotated to one side, and the jaws are locked. The phalanges are flexed, the thumbs drawn into the palm, the wrists flexed, and the arm at the elbow. The legs are extended and the feet everted. The circulation is sometimes so greatly impeded as to cause rupture of the vessels, and hemorrhage from the nose, ears, bronchi, and sometimes into the cerebrum, takes place. This stage lasts from a few seconds to one or two minutes, to be succeeded by the stage of clonic spasm.

During this stage the whole body becomes agitated by the alternate contraction and relaxation of the muscles. The eyes twitch or roll, the muscles of the face incessantly move, which gives the features a hideous expression; the jaws open and close; there is grinding of the teeth, and biting of the tongue; there is a hurried, jerky respiration; a bloody, frothy foam escapes from

the lips, and there is jerking of the limbs and body. Not infrequently the feces and urine are passed during the convulsive action. The pupils are usually very much dilated during this stage, and the return to the normal may be the first evidence of a cessation of the attack. The respiration during this convulsive period is slow, stertorous, and irregular. Where the convulsions are long continued, the temperature may reach 105° , 106° , or more.

This stage lasts from three to five minutes, when the patient recovers consciousness, or falls into a heavy sleep, lasting for a few minutes or hours. On awakening, the patient complains of muscular soreness and headache.

Nocturnal Epilepsy.—The attack occurs in the night, and may be unknown to patient or friends. When a patient of rather dull mind complains at intervals of feeling tired, has a headache, in fact there is general muscular soreness, and the patient seems dazed and confused, and if, in addition, he has involuntarily wet the bed, the probability is that of epilepsy, and if the pillow shows some blood-stains, there can be little doubt as to the cause.

Petit Mal.—In this form there is no convulsion, and the patient does not fall. The attack comes on suddenly without any premonitory warning; the patient suddenly loses consciousness, the speech, or whatever he was doing, being suddenly and momentarily stopped, to be resumed again in a few seconds. If talking, he resumes the broken sentence as though nothing had occurred, the patient being rarely aware of his condition. In rare cases he may fall, but there is no convulsion. In some cases the patient appears a little dazed for a few moments after the attack.

Jacksonian Epilepsy.—This is characterized by spasms of a local character, though, as the disease advances, they may become general. Tingling and other sensory sensations may precede an attack.

Consciousness, as a rule, is maintained. This is sometimes called cortical epilepsy, and is due to irritation of the cortical motor centers of the brain.

Diagnosis.—A typical case of epilepsy can hardly be mistaken for any other lesion. The picture is so striking and horrible that a novice in medicine will recognize it. The sudden attack, the patient falling in a convulsive fit, the tonic, followed by the clonic spasms, the frothing at the mouth, and the coma or

deep sleep following, make the diagnosis very easy. In *petit mal* it may not be so easy to recognize unless we have the history of previous attacks.

Hysterical convulsions will be recognized by the more regular rhythm of the spasms and the general history.

Prognosis.—This is unfavorable in idiopathic cases, though, where symptomatic, a cure may be effected where the cause can be removed. However, the habit once acquired and continued for some months, is one of the most difficult and stubborn lesions to overcome.

Epilepsy seldom proves fatal, but with the advance of years the intellect becomes more feeble, sometimes resulting in insanity or imbecility.

Treatment.—A careful search must be instituted for the exciting cause, and since this is often found to arise at some distant point, like the rectum, the uterus, the ovaries, the urethra, or the stomach, all wrongs of this character should be corrected. An adherent foreskin should be released, and, where elongated or constricted, circumcision be performed.

All wrongs of the stomach should be corrected, and the patient placed on a nourishing but easily digested diet. It should consist largely of fruits, cereals, and vegetables, meats being allowed sparingly. The bowels should receive careful attention, constipation being avoided. Cold sponge-baths once or twice daily are also beneficial. Where the disease has followed injuries to the head sufficient to produce scalp wounds, scar tissue should be removed, and if there be any depressions causing irritation, surgical measures must be used before any relief can be promised. If pressure result from a tumor or abscess, the skull should be trephined and the pressure overcome.

During an attack the patient should be placed in a horizontal position, the clothing loosened about the throat, and cork, rubber, or a soft piece of wood placed between the teeth to preserve the tongue from injury. Where the convulsions are very intense, chloroform should be used till the throes subside, when the patient should be allowed to sleep till spontaneous awakening occurs.

The medical treatment for epilepsy has not been attended with very satisfactory results. The bromids are used probably more frequently than all other remedies combined, yet few, if any, recoveries can be recorded from its use. That it is a good

nervine sedative, however, none will deny, and some relief may be obtained from its administration.

Nitrate of amyl inhaled during the aura has prevented the attack.

Enanthe crocata and *solanum carolinensis* have proven useful in my hands. *Gelsemium* must not be overlooked when selecting agents for this lesion. Each case needs careful study and the various conditions met as they arise.

INFANTILE CONVULSIONS.

Synonym.—Eclampsia.

Definition.—Convulsions in children, similar to those of epilepsy, are of frequent occurrence, but differ from the latter in that when the cause is removed, the convulsions cease.

Etiology.—The causes giving rise to convulsions are many, and present a wide range in variety; one of the most common being gastro-intestinal irritability, either as a result of inflammation or overeating, especially unripe fruit or other indigestible substances. Dentition is another fruitful source of infantile eclampsia, especially when occurring in nervous children. Intestinal parasites not infrequently are the exciting cause, the *ascaris lumbricoides* being peculiarly exciting. An exciting cause, frequently overlooked, is an elongated or adherent foreskin, or the clitoris may be the source of the irritation.

The infectious diseases are often announced by a convulsion, cerebro-spinal fever, measles, scarlet fever, small-pox, and pneumonia particularly. Brain lesions, either organic or functional, are commonly preceded or accompanied by convulsions. Spasms occur in many rickety children. Following scarlet fever, uremic convulsions are occasionally seen.

In peculiarly nervous children, a severe fright is sufficient to bring on an attack. Convulsions occasionally occur in the newborn, especially where the delivery has been instrumental.

Pathology.—Unless due to meningeal hemorrhage, tumors, exudates, or hydrocephalus, there are no anatomical changes.

Symptoms.—Frequently there are premonitory symptoms, such as flushed face, general irritability, gritting of the teeth,

twitching of the muscles, and *closing the fingers over the thumb*; or the attack may come on suddenly without any warning. It frequently begins in the right hand, to be followed by general convulsive action. At first there is rigidity, the eyes stare and are fixed, the body is stiff, or the head drawn backward and the respiration almost suspended, the child assuming a cyanotic appearance. This stage is but momentary, when clonic spasms follow, all the voluntary muscles being involved. There is rolling of the eyes, jerking of the limbs, and more or less contortion of the face. During the convulsion, the tongue is frequently bitten, and a bloody froth collects upon the lips. Sometimes the urine and feces are passed involuntarily. The attack usually lasts but for a moment or two, but to the frightened mother it seems an hour. The subsidence of the attack is followed by a sound sleep, or the child passes into coma.

Diagnosis.—This is very easy, in fact, is generally diagnosed by the mother, and announced to the physician by the frightened messenger who is hastily started for the doctor.

Prognosis.—This depends upon the cause. Unless due to organic changes, or occurring after the child has been sick for some time, as in cholera infantum, the prognosis is favorable. A child in good health, taken with convulsion rarely ever dies from an attack.

Treatment.—To overcome the convulsion, a few inhalations of chloroform is the most reliable agent that can be employed. As soon as the convulsion subsides, we commence the administration of remedies to prevent a return of the spasms. If called shortly after a meal, notwithstanding the protestations of the mother that the child has had *nothing* to eat, it is a good plan to administer an emetic, for it rarely ever fails to give relief. When due to an overloaded bowel, a dose of castor-oil and a large enema will be followed by good results. When not due to either of the above causes, a careful search must be made for the exciting cause. Gelsemium, lobelia, and passiflora will be the remedies most frequently used when called to a child in convulsions. Where a convulsion announces the onset of a fever or one of the infectious diseases, there is generally no special treatment needed, for the convulsion is rarely repeated.

ACUTE CHOREA.

Synonyms.—St. Vitus's or St. Anthony's Dance; Sydenham's Chorea.

Definition.—An acute disease affecting children mostly, and characterized by irregular, involuntary, and clonic spasms of the muscles, a tendency to endocarditis, a variable amount of psychical disturbance, and a liability to recurrence.

Etiology.—Among predisposing causes may be mentioned age, sex, and race.

Age.—The disease occurs most frequently between the ages of five and fifteen, puberty being especially favorable to its development.

Sex.—Of five hundred and fifty-four cases reported by Osler, seventy-one per cent were in females, and twenty-four per cent in males, the ratio rising still higher in females after puberty.

Race.—It is peculiarly a disease of the white races, rarely ever occurring among the colored races.

Heredity.—An effort has been made by some to show a hereditary tendency in the disease, but the fact that only about ten per cent of all choreic patients can show a family history of chorea, makes this quite a doubtful etiological factor.

Rheumatism.—The same may be said of rheumatism, and though English statistics show quite a large per cent of rheumatism in chorea, the history of other countries does not bear out the same conclusions, and it is probable that where the two are found in the same patient, it is a coincident.

Endocarditis.—Some observers claim endocarditis as a cause, due to the lodgment of vegetations from the valves in the cerebral vessels. In the large majority of cases, however, it is the result rather than the cause.

Infectious Diseases.—Scarlet fever, whooping-cough, pyemia, puerperal fever, and gonorrhea have preceded the disease, but it is very doubtful if they have any significance as an etiological factor.

Reflex irritation, while a possible cause, has probably been overrated, though, in one of my cases, the release of an adherent clitoris was followed by a rapid cure, where medication had failed.

Pregnancy frequently is the exciting cause, in one of a neuro-pathic temperament.

The cause, then, is elusive, and in children of a nervous temperament may arise from fright, shock, mental or emotional excitement.

Pathology.—No constant or characteristic lesion has been found, the pathology still being obscure. Some believe a functional disturbance of the centers that control the motor apparatus is the chief lesion, while others believe the lesion to be embolic, and still others the result of infection.

Symptoms.—In the beginning the affection is generally unilateral, though both sides are soon involved. It usually begins with slight involuntary twitching of the muscles of the hands or face. It is noticed that the child spills liquids when attempting to drink or pass them at the table, or that he lets articles drop, and this being attributed to carelessness, he is often scolded or punished, which only aggravates the disease. This twitching or rather jerking of the muscles, extends to the shoulders, which are twisted or raised in a jerky manner. The involuntary movements may extend to the leg, making locomotion in severe cases quite difficult.

In the more severe cases, the child presents a pitiable appearance; there is batting of the eyes and jerking of the mouth, the hands are almost in a constant spasm, the legs jerk irregularly, and the child is unable to feed or dress himself, and many times is even unable to walk. The child's disposition seems completely changed, becoming cross, peevish, and with sudden outbursts of anger, especially if corrected for his seeming carelessness.

In severe cases his speech is affected, articulation being so difficult that often no attempt is made to talk. Generally the involuntary movements cease during sleep, though in the most pronounced cases the rest is disturbed even in sleep. Occasionally nocturnal incontinence occurs.

The appetite becoming impaired, the child frequently becomes weak and anemic, and where endocarditis occurs, a blowing murmur may be heard in the apex region.

As a rule, there is no fever unless complications exist.

Diagnosis.—Few diseases present more characteristic symptoms than chorea, and the laity generally diagnose the disease even before the physician is consulted. The peculiar twitching and jerking of the muscles of the face and hands, extending to

other parts of the body, is apparent to every one, and the diagnosis becomes very easy.

Prognosis.—This is favorable in the large majority of cases, though there is a tendency to one or more relapses. The disease runs from four to ten weeks, though sometimes it may linger three or four months.

Treatment.—The child should be dealt with kindly, and little attention paid to his contortions; for this reason he should be removed from school as soon as recognized, that he may be saved the pain of thoughtless laughter and remarks by fellow play-mates.

The diet should be nourishing though easily digested.

In the way of medication, there are a few remedies that have proven of great value.

Macrotys.—Where there is muscular soreness, whether due to acute rheumatism or muscular contraction, macrotys will give good results. From a half to one dram of the specific medicine added to four ounces of water, and a teaspoonful given every two or three hours, will not disappoint.

Gelsemium.—Where the child is extremely nervous, gelsemium will be the better agent.

Cypripedium.—This agent has been used quite successfully by Eclectics for this troublesome affection. A *broad, puffy tongue* is the special symptom. It should be given in quite tangible doses, ten to fifteen drops every two hours.

Physostigma, scutellaria, avena, cannabis, hyoscyamus, and like remedies, should be used.

Dr. Webster speaks highly of the use of the tonic faradic or secondary current of electricity.

Should there be no improvement in a carefully selected medication, the clitoris should be examined for adhesions, and released when present. I seriously object to subjecting young girls to any unnecessary examinations, and since many of these cases yield to medication, I should only resort to this measure when other means failed. After treating a severe case of chorea in a girl of twelve, for two weeks without any improvement—in fact, there was rather an increase in the severity of the symptoms—I found a *very tightly adherent clitoris*, the release of which was followed by speedy relief. One could hardly believe so great a change as took place within twenty-four hours; but since these

are exceptional cases, do not *examine every* girl that has chorea, till other measures fail.

PARALYSIS AGITANS.

Synonyms.—Shaking Palsy; Parkinson's Disease.

Definition.—A chronic disease of the nervous system, characterized by rhythmical contractions of the muscles of the limbs, associated with weakness and rigidity.

Etiology.—This is a disease of adult life, rarely ever occurring before forty, the largest number appearing between the ages of forty and sixty. It occurs more frequently in men than women, the ratio being about two to one. Heredity seems to bear no causal relation other than to furnish a neurotic temperament. Acute diseases, cold, fright, great emotion, worry, mental strain, and injuries have been considered as producing causes, though no definite cause is known.

Pathology.—No characteristic lesions are found, though, in all probability, the disturbance is in the cerebral cortex. Some regard the degeneration of a senile type. Certain sclerotic changes have been described in the spinal cord, starting from the neighborhood of the vessels. Nothing, however, is positively known of the nature of the lesions.

Symptoms.—Except where the result of fright, the disease generally comes on so insidiously that the patient is unable to say when the first symptom began. The first evidence is usually a slight tremor in the muscles of the fingers and hand, gradually extending to the arm and leg of the same side. The right side is the first to be affected as a rule, then both become involved. The motions of thumb, fingers, and wrist are characteristic, the forefinger sliding over the ball of the thumb, while the wrist is semi-rotated. If the head be involved, there is a constant nodding motion. The tremors are usually suspended during voluntary motion, at once to resume when such action ceases. The tremors are constant during waking hours, save in the exception just noted. During sleep there is a suspension of the tremblings.

It is noticed as the disease progresses, that voluntary movements are slow and awkward, the muscles appearing stiff, another characteristic of the lesion.

The *attitude* and *gait* of the patient is most striking. The head is thrown excessively forward, the eyes straight away or slightly elevated, and the face passive. In walking, the patient takes very short steps, and *trots* along, hurrying one foot after the other, seemingly to prevent pitching forward. The knees are apt to touch or rub, while the feet may be slightly everted, or they may cross.

The muscles show no evidence of atrophy or trophic changes, even in the advanced stages. The electrical irritability of the muscles is retained, and the reflexes remain normal. The bladder and rectum are usually unimpaired.

The *facial expression* of victims of "shaking palsy" is also characteristic, and, because of so little play of the features, is as though the patient wore a mask. In some cases the mouth is kept open, the saliva dropping constantly from the mouth. The speech is usually slow, monotonous, and the voice tremulous and high-pitched.

Diagnosis.—The symptoms are so characteristic that one can scarcely be mistaken in the diagnosis. We recognize it from *multiple sclerosis* in that the tremors are not increased by voluntary movements, that it usually begins in the upper extremities, that there is no oscillation of the eyeballs, and that there are no sensory disturbances. From *chorea*, by the marked regularity of the tremors, from four to six per second, by their persistency even during sleep, and that the tremulous condition of the muscles is not increased by voluntary movements.

Prognosis.—The disease is incurable, though there is no immediate danger to life, the patient living for years. There may occasionally be intermissions of the tremors, though generally there is a slow advance in the disease. Death usually occurs from some intercurrent disease.

Treatment.—Fowler's solution, hyoscyamus, and phosphid of zinc have each had their advocates as beneficial remedies in this disease, though their influence is questionable. The patient should avoid, as far as possible, all mental excitement and excessive fatigue of the muscles. The diet should be as nourishing as possible, though one that is easily digested, and the general health improved when impaired.

MIGRAINE.

Synonyms.—Hemicrania; Sick Headache.

Definition.—This is a neurosis characterized by severe paroxysmal attacks of headache, and generally attended by nausea and vomiting.

Etiology.—Females are more frequently affected than males, and those of a nervous temperament rather than those of a sanguine or lymphatic type. The disease shows strong hereditary tendencies, usually on the mother's side. It seems to be closely associated with wrongs of the female reproductive apparatus; thus menstrual derangements and ovarian disturbances go hand in hand with migraine.

Among the exciting causes may be mentioned gastro-intestinal disturbances, naso-pharyngeal wrongs, dental irritation, emotional excitement, grief, shock, eye-strain, or anything that tends to impair the nervous system of those predisposed. An important and often overlooked cause is peripheral irritation, as seen in rectal diseases, urethral lesions, and the nerve waste that follows lacerations of the uterine cervix and perineum.

Pathology.—There is no characteristic lesion found, and the pathology is therefore obscure. Various theories have been advanced, but none proven. Vaso-motor disturbances are thought to be the chief wrongs, while arterio-sclerosis has been found present in others.

Symptoms.—There are generally premonitory symptoms that give the warning note. These vary, and may consist of malaise, chilliness and flashes of heat, or dizziness. Sometimes there is mental depression and confusion of ideas, or the opposite condition, that of excitation. Not infrequently there will be perverted vision, as flashes of light, zigzag lines, balls of fire, or visions of animals. Numbness of face and tongue, followed by pallor, may usher in an attack.

The pain is generally unilateral, the left side being more frequently affected, though, if long continued, the whole head becomes involved. A favorite starting point is over the eye, gradually extending as the disease grows more severe. There may be tenderness over the affected region, and sometimes twitching of the muscles. In most cases the headache is accompanied by

gastric disturbances. It may be extreme nausea without vomiting, or there may be persistent emesis. Not infrequently a short period of unconsciousness supervenes. Permanent local grayness of the hair is not uncommon where the paroxysms have been of unusual severity.

The duration of the attack varies, usually subsiding in twenty-four hours, though it may last two or three days. An attack causes great prostration, which soon passes away after the paroxysm is over.

The disease continues for years, and sometimes for life, though it is apt to disappear after the age of fifty.

Diagnosis.—This is readily made by the history of the case and the symptoms already described.

Prognosis.—So far as life is concerned, the prognosis is favorable, and where due to reflex causes and they can be removed, many will permanently recover.

Treatment.—In all cases of migraine, a careful search should be instituted for the cause. It so frequently arises or is continued by irritation at the various orifices, that the rectum, urethra, vagina, uterine cervix, and nasal passages should be examined. Any wrongs must be corrected if we are to expect any permanent benefit.

The patient should be placed on a dry diet, which should consist principally of fruits, cereals, and vegetables. Constipation should be overcome.

For the attack, where the pain is intense and the heart's action good, a five-grain antikamnia powder will usually give relief. I have one patient that only obtains relief by a hypodermic of a quarter grain of morphia. *Passiflora* in half-teaspoonful doses will sometimes give relief. In some of these patients there seems to be a rheumatic or uric-acid diathesis, and the salicylates and antirheumatics will be indicated. Where due to malaria, arsenate of quinia, gelsemium, *chionanthus*, and *uedalia* should be tried. Dr. Webster speaks highly of *melilotus* in such cases. With the first prodromal symptoms, a thorough washing out of the stomach will frequently abort the attack or materially lessen its force. A thorough emetic is the best means of accomplishing this object.

HYSTERIA.

Definition.—A functional disturbance of the general nervous system in which there is “an abnormal susceptibility to external impressions, and a deficient power of the will to restrain its manifestations,” and characterized by a multitude of symptoms that simulate many diseases.

Etiology.—Among the predisposing and exciting causes may be mentioned:

Sex.—About nine hundred and fifty cases out of every thousand occur in females.

Heredity.—A very large per cent of all cases of hysteria occur in families of neurotic tendencies, such as epilepsy, insanity, chorea, sick headache, neuralgias, and allied conditions.

Age.—Hysteria usually develops between the age of puberty and twenty-five, few cases occurring after the age of forty.

Psychical Influences.—In neuropathically inclined patients, fright, especially of a severe kind, like railroad accidents and fire, great shock, fear, love, jealousy, disappointments, anxiety, melancholy and remorse, are apt to be followed by hysteria.

Environments.—Girls reared in luxurious city homes, with but little responsibility, and who are petted, pampered, and reared amid excitement and dissipation, are far more subject to hysteria than those reared in the country, and who are taught to be useful and share some of the responsibilities of life.

Sexual derangements are found to underlie many cases of hysteria. Irregular menstruation, uterine displacements, ovarian irritation, ulceration of the cervix, an adherent clitoris, a vaginitis leucorrhea, and not infrequently masturbation, are found on examination.

Ranney believes eye-defects and muscular insufficiencies in the orbit attend nearly all hysterical patients.

Pathology.—Hysteria is a purely functional disturbance of the nervous system, no anatomical lesions being found in this disease.

Symptoms.—The clinical picture of hysteria embraces such a varied and complex list of symptoms that it will be impossible to name them all. For convenience of description the symptoms may be divided into mental, sensory, motor, and visceral.

Mental Condition.—One of the characteristic conditions of hysteria is a *defect* of the will and an excess of the emotions. These patients crave sympathy, and are peculiarly self-conscious. They readily give way to joy or grief, the effects of which, laughter and tears, are indulged in to excess. Uncontrollable laughing or crying for hours is sometimes witnessed. Such patients, when sick, make no effort to get well, preferring the sympathy of friends to convalescence, and not infrequently so skillfully magnifying their symptoms that they not only succeed in deceiving their friends as to their true condition, but the physician as well. Sometimes they will produce artificial lesions by the application of irritants producing various eruptions, or, as in one case that came under my observation, the patient had produced red spots on the palms of the hands by the use of a red rose on her hat, and so skillfully did she hide her work and so persistently did she deny all knowledge of the cause, that her parents sent her to Seton Hospital for treatment.

Finding, however, that the physicians were not as gullible as her parents, and that the treatment suggested was not to her liking, she confessed to the part she had played in the deception. Some patients, with a perverted sense of delicacy, show concretions or bodies, and insist that they have passed the same from the bladder or rectum.

Sensory Symptoms.—Hyperesthesia may manifest itself simply by tenderness on pressure over sensitive points, or it may arise as spontaneous pain. While hyperesthetic spots may be found in any part of the body, they are rare on the extremities. A favorite location is the vortex, where the pain is frequently agonizing in character, and is known as *clavus hystericus*. Other favorite locations are over the sternum, under the mammæ, over the ovaries, and along the spinal column. These sensitive spots or zones are known as "*hysterogenic points*." These painful points may involve the entire spinal column or only a single point, and a simple touch may cause exquisite pain. Abdominal hyperesthesia may resemble gastric ulcer, appendicitis, or peritonitis. The hysterical breast is recognized by the great tenderness, by constant variations in the swelling, and by "the recurrence of the symptoms at the usual period or after exceptional excitement or fatigue."

The special senses may be affected, as hyperesthesia of the

eye or ear, or sight may be limited or even lost for certain colors, while the loss of the sense of taste, smell, or hearing is not infrequent, or the opposite condition, extreme sensitiveness to sound, taste, and smell may be present.

Anesthesia, or loss of sensation in a limb or entire side is known as *hemianesthesia*, and is quite significant as a diagnostic factor. "Sensation has sometimes been restored to a part by the local application of metal plates, especially iron, copper, zinc, or gold (*metallo-therapy*), and under these circumstances anesthesia may be found at the corresponding spot on the previous healthy opposite side of the body."

Motor Symptoms.—"Paralysis.—Hysterical aphonia is not uncommon; it results from paralysis of the adductors of the vocal cords. It is important to note that adductor paralysis, without abductor paralysis, is always a functional disorder. On the other hand, abductor paralysis, existing alone, is mostly due to organic disease, and very rarely the result of hysteria; it causes stridor and dyspnea, and may even in hysteria lead to dangerous asphyxia. Dysphagia may arise from functional paralysis of the pharyngeal muscles. Ptosis also occurs as a hysterical symptom; it may be single or double. Paralysis of the limbs occurs in the form of paraplegia or hemiplegia, or all the limbs may be paralyzed together. The paralysis in these cases is often not complete, and if the patient makes an effort to move the limb in a particular direction, it may be seen that some antagonistic muscles contract. The patient may assert that she is unable to lift the arm, yet if it is raised by any one else she will often keep it supported or let it drop only half-way, showing that the muscles believed to be paralyzed have still a considerable amount of power. Also, if the attention is directed to other things the patient may unconsciously move the supposed useless limb. If one lower extremity is alone affected, on attempting to walk the patient drags the paralyzed limb behind her, making no effort to bring it forward, but only hopping along on the sound limb. The nutrition of the muscles and the electrical reactions are generally normal, but wasting of muscles is sometimes observed. Knee-jerks are generally normal, and there is no true continuous ankle-clonus, but there is often a clonus lasting only a few seconds, and in some cases the knee-jerks are excessive. In paraplegia the legs can often be moved in bed, but the patient is quite unable to stand,

and there is never incontinence of urine or feces; in hemiplegia the leg is sometimes worse than the arm, and the face and tongue are always spared. Paralysis is sometimes, but not always, accompanied by anesthesia. In a rare form of hysteria, every attempt to move, or contract a muscle, is painful (*akinesia algera*). Another form of hysteria is a disorder called *astasia-abasia*, in which the patient can neither stand nor walk, though he can move the legs in bed, and there is neither inco-ordination nor sensory failure." (Taylor.)

Convulsive Seizures.—Following excitation of the emotions the patient becomes hysterical, laughs or cries, and complains of a ball in the throat (*globus hystericus*), which in turn is followed by convulsions. The muscular spasms are clonic and irregular. Gradually the attack subsides, with the passage of a large quantity of limpid urine. The convulsions sometimes simulate true epileptic attacks, though the tongue is not bitten. "The convulsive seizure is usually followed by emotional displays, by cataleptic poses, by opisthotonos or other distortions, and by attitudes and grimaces expressive of the deepest emotions." Following this, the patient may go into a trance, or hallucinations and delirium may follow.

Contractures and Spasms.—Tonic contractions may affect one side, hemiplegic in character, or from the waist down (paraplegic), or be confined to a single part (monoplegic), as in hysterical contraction of the jaw (trismus). Where one side is affected, the arm is generally flexed at the elbow, while the leg is rigidly extended. The contractions usually disappear during sleep; but in exaggerated cases, only the deepest chloroform narcosis is sufficient to produce relaxation.

Phantom tumors, simulating pregnancy, are sometimes seen, and are due to contraction of certain abdominal muscles and relaxation of the recti, permitting the inflation of the intestines with gas.

Clonic contractions are generally rhythmic in character, and known as "rhythmic chorea" ("hysterical chorea").

Visceral Symptoms.—*Globus hystericus*, the sensation of a ball rising in the throat, is often associated with spasm of the pharynx and esophagus, rendering deglutition difficult or impossible. Gastric disturbances are quite common, and furnish a variety of symptoms. In one the food is regurgitated soon after

eating, there being little or no nausea; this may continue for months with but little emaciation; in another there will be hysterical anorexia, the patient persistently refusing food for days, and growing quite emaciated. In these cases, however, there is nearly always deception practiced, the patient eating clandestinely. Another will have a perverted or depraved appetite, eating undesirable and unwholesome food. In rare cases there is reversed peristalsis, the patient vomiting rectal enemas, or there is peristaltic unrest. While diarrhea may be present, constipation of a most persistent type is the rule, and it is not infrequent to find such patient going a week or ten days without stool.

Respiratory symptoms are quite frequent, the patient breathing from forty to one hundred per minute, without change in the frequency of the pulse or evidence of dyspnea. A dry, spasmodic, or barking cough is a not infrequent symptom.

Circulatory disturbances, such as the "irritable heart" and palpitation, are exceedingly common, while pallor, local flushings, and pseudo-angina occasionally are seen.

Urinary symptoms are nearly always present. After an attack of hysteria the urine is abundant, limpid, and of low specific gravity. Suppression, hysterical anuria, may last for several days, yet uremia fail to appear.

"*Trance or lethargy* is, like catalepsy, sometimes the result of hysteria, or of exhausting illness, or of hypnotism. The patient is in a peculiar condition resembling sleep, and may remain so for days or even weeks. The face is pale, the limbs relaxed and the eyelids resist efforts to open them. The pupils are moderately contracted or dilated, and react to light. The pulse is small, the heart-sounds are feeble or inaudible, and the breathing is extremely quiet, so that occasionally the patient has been thought to be dead. In prolonged cases there are remissions in which the patient may take food, relapsing again into stupor. Most cases recover. *Double consciousness* and *somnambulism* are other developments of hysteria." (Taylor.)

Diagnosis.—The family history should throw some light upon the case. Thus, if similar conditions have occurred in the family or near relatives, or they have had insanity, chorea, epilepsy, sick headache, or neurasthenia, and if the patient has been excitable from early childhood, and but little effort has been used to control excessive emotions,—if with such a history the various symp-

toms above noted be present, there can be but little doubt left as to the true condition.

Prognosis.—This is always favorable as to life, and nearly always as to a cure of the disease, though years may elapse before this is accomplished. Usually after the menopause, the disease disappears.

Treatment.—There is no class of patients that receive as little sympathy as the victims of hysteria, and an important part of the treatment is patience on the part of the attending physician. While they are not to be humored—in fact, the physician should exercise firmness with his patients—they should not be allowed to observe annoyance or disgust or disinterestedness on the part of the medical adviser. Confidence in the physician must not be shaken. Hypnotism or suggestion will prove more or less beneficial in nearly all cases. Where possible, the patient's environments should be changed and travel, with congenial company, often works wonders in the way of a cure. The patient's mind must be gotten away from self, and anything that will accomplish this will be beneficial. A visit of several weeks' duration will often answer the same purpose.

The excitement and dissipations of city life also tend to aggravate hysteria, and a change should be made from the city to the country, where quiet, fresh air, plenty of sunshine, a nourishing diet, and regular hours can be secured.

The exciting cause must be determined and removed before much benefit can be expected, and a most thorough examination should be made of the rectum, where pockets, papillæ, fissures, ulcers, hemorrhoids, undue contraction of the sphincters, or redundant and prolapsed tissue may be found responsible for the lesion. The uterus, both body and cervix, the vagina, the perineum, the ovaries, and the urethra should be carefully inspected; for the *cause* of the trouble *very often* is found at these parts, a correction of which often gives instant and permanent relief.

In the way of medication the treatment will be symptomatic, meeting the various conditions as they arise. The remedies most frequently indicated are pulsatilla, passiflora, viburnum, gossypium, gelsemium, ammoniated tincture of valerian, scutellaria, cypripedium, and like remedies, which should be studied with reference to this condition.

The rest-cure will be highly beneficial in many cases, while

faradic and static electricity is followed by good results. Sometimes the dread of unpleasant medication is sufficient to act as the restraining cause, till a cure is effected. Thus one cure comes to my mind where my preceptor, with the old lobelia emetic, effected a cure. At the first call the emetic was given for its full effect, two hours or more being required in its administration. A second attack was treated in the same way, and the interval between attacks lengthened. At the third call, while getting ready the nauseating mixture, the patient, with a woe-begone disgusted look, said, "Doctor, don't you give nothing but pukes?" "Nothing else for your kind of sickness," said the doctor; "but I want to assure you that you will *never have to take another*, for this is the *last attack* you will ever have." The cure was complete. The dread of the emetic, together with the mental impression, "*You will never have to take another*," was sufficient to arrest the disease in this case.

In nervous children the treatment should be prophylactic. They should not be advanced too rapidly in their school-work, should be taught self-restraint, not allowed to have every whim gratified, should have but few cares during the stage of puberty, and all dissipations of city life carefully avoided till full maturity, and but few cases will occur.

NEURASTHENIA.

Synonym.—Nervous Prostration.

Definition.—A chronic functional disease of the nervous system, characterized by mental and physical exhaustion.

Etiology.—Like most functional nervous lesions, certain predisposing factors play an important part, chief of which may be mentioned heredity, occupation, age, and sex.

Heredity.—All parents suffering, not only from nervous derangements, such as irritability, degenerations, etc., but also from syphilis, tuberculosis, rheumatism, and kindred affections, bequeath to their offspring a feeble vitality and feeble resisting power which are favorable to neurasthenia.

Occupation.—Any profession or calling that entails great mental strain, and where large responsibilities are assumed, favors neurasthenia.

Age.—Neurasthenia comes with maturity, when the cares and anxieties of life press heavy; hence is rarely seen before twenty nor after the age of fifty-five or sixty, when the burdens are shifted to younger shoulders.

Sex.—Unlike hysteria, the majority of neurasthenics are found among men.

Exciting Causes.—Overwork exhausts not only physical but mental power as well, and the great competition and tension that prevails in all lines of work and business, necessitates a great tax on the mental power, and often results in overwork. Whenever a man takes his business cares home with him, dines with them and sleeps with them, he is on the road that leads to neurasthenia. Sexual excesses and masturbation exhaust nerve force, and are a fruitful cause of the disease.

Orificial irritation is one of the most common exciting causes, and one that is perhaps the most frequently overlooked. Rectal lesions are prolific causes of nerve waste, while urinary wrongs sap the vitality and give rise to prostration.

Unhappy marriages are not an infrequent cause of neurasthenia in both sexes, while fear of infectious diseases may so wear upon the nervous system as to give rise to the disease. Various accidents, especially those occurring on railroads and on the water, may cause the disease, and is known as traumatic neurasthenia.

Pathology.—There are no characteristic pathological changes in this disease, and about all that can be said of the lesion is, that it consists of irritation of the nerve centers, followed by more or less weakness.

Symptoms.—The symptoms are so varied and complex that it will simplify their narration to group the cases according to the predominance of certain phenomena; thus we have the cerebral, the spinal, the gastro-intestinal, the cardiac, the urinary, and the sexual varieties.

The general symptoms are great irritability, marked despondency, great prostration, both physical and mental, without sufficient cause, and loss of weight. So many are the symptoms that the patient, fearing that some may be forgotten, presents a long list of symptoms carefully written down.

The Cerebral Variety.—Headache is a prominent symptom,

there frequently being tenderness of the scalp. Insomnia is quite characteristic, and the patient arises unrefreshed; there is more or less despondency; the patient is anxious, worried, and fearful of some impending danger. There is impairment of memory, and reading seems to tire the patient; in fact, a continued tired feeling is generally present.

The Spinal Variety.—Great weakness and prostration is a common symptom, the patient complaining of feeling sore and stiff on rising. Backache, with tenderness along the spine, is characteristic, while there is perverted sensibility, manifested by a tingling, crawling, or burning sensation, or certain parts will feel hot or cold; sometimes there will be lightning pains, simulating locomotor ataxia. Ankle clonus is sometimes present, while the reflexes are exaggerated.

Gastro-intestinal Variety.—Gastric disturbances, with their attendant symptoms, are the chief characteristics of this form. Hyperacidity, waterbrash, nausea, retching, and vomiting, with more or less headache, are present. The patient sleeps poorly, has unpleasant dreams, and develops an irritable disposition. There is flatulency, rumbling of the bowels, constipation alternated with diarrhea, and a sense of weight or soreness over the abdomen.

The Cardiac Variety.—While there is an absence of organic lesions, there is palpitation on slight exertion, precordial distress, and sometimes sharp pain as in angina. Throbbing of the abdominal aorta is a distressing symptom and one that causes much anxiety on the patient's part. In some cases a capillary pulse may be detected. This group of symptoms causes the patient to become fearful of a sudden termination of life. Loss of flesh is apt to accompany this form.

Urinary Variety.—The quantity of urine voided is usually small, and albuminuria, oxaluria, and glycosuria may be present. The patient becomes irritable, and there is a dull headache.

Sexual Variety.—A victim of this variety is often an object of pity. The fear of becoming impotent preys upon the mind, the patient is melancholy, sleeps poorly, has nocturnal emissions, complains of pain or crawling sensations in the testicles, has perverted sexual desires, and frequently masturbates. The patient, worried and distracted, leads a miserable existence.

Diagnosis.—This is not often difficult. The physical and

mental prostration without undue exertion, the multiplicity of symptoms, with due prominence of some one of the above groups, makes the diagnosis one of but little difficulty.

Prognosis.—Where the patient has not become the victim of morphia, chloral, or alcohol, and where a rational treatment is early observed, the prognosis is favorable. Where the patient's mind can be centered on something besides self, and where hope can be aroused, the patient will recover.

Treatment.—A careful search for the cause must be made, the removal of which starts the patient, many times, to a speedy recovery, the history of the following case being a good illustration:

Mr. A, aged forty-five, a prominent business man, had suffered many things, chief of which was a constant headache at the base of the brain. Failing to get relief from medication, galvanism, and massage, he was placed on the rest-cure as outlined by Weir Mitchell. He gave up his business for six months and devoted his time to the rest-cure. After six months of this treatment the pain in the head subsided, and he returned to his business, only to find a return of the pain in the occipital region. At this time I saw the patient, and obtained the above history. On examining his rectum (he was not aware of any trouble in this part of his anatomy), I found a rectal fissure, the cauterization of which not only stopped the headache, but effected a permanent cure. After a failure of six months' treatment by diet and rest, a single application of nitric acid to the anal fissure effected a cure.

Where orificial irritation is the cause of the lesion, and it is a very frequent cause, nothing in the way of rest or medication can take the place of a removal of the cause.

The same may be said of overwork of an organ; it must have rest, and if it be the brain, but little result may be looked for unless mental rest is secured. Where sexual excesses are draining the system, the patient can not hope for relief if he continue his dissipations.

Many times a sea voyage gives the best of results, securing not only an enforced bodily rest, but the constant change (where the voyage is along the coast with frequent ports) furnishes an agreeable rest for the mind as well.

The rest-cure, as first introduced by Weir Mitchell, will many times be the only effective treatment. This may be modified to

suit the individual case. The treatment consists in absolute rest (the worst cases not being allowed to get up to void urine, the feces, or even turn in bed without assistance), passive exercise, massage, diet, and electricity. As the patient improves, baths are to be added. The treatment is to be continued from one to three months. A favorite diet in the beginning is one glass of milk every two hours, gradually increasing the quantity till he is taking a pint or more at each feeding. After two or three weeks, solids are added, which consist of fruits and vegetables, and finally chops, steak, and roast-beef. The faradic and static currents give the best results.

Where the patient is not very sensitive to shock, cold shower or sponge baths are attended by good results. As the patient grows stronger and takes on flesh, outdoor exercise should be taken, care being exercised not to carry it to exhaustion. Tennis, golf, rowing, and surf-bathing will prove of great benefit in stimulating the appetite, improving digestion, and establishing the excretions.

The patient should have cheerful surroundings, agreeable companions, and his reading should be of a light vein and a humorous style, especially avoiding the tragic and all that tends to excite the mind. In the way of medication, the treatment will be entirely symptomatic, only giving remedies when specially indicated. *Avena*, *passiflora*, *rhus*, and the compound tonic mixture will be frequently called for, while chronic constipation must be corrected by appropriate medication before much relief will be obtained.

PART IX.

DISEASES OF THE MUSCLES.

ACUTE MYOSITIS.

Synonym.—Acute Polymyositis.

Definition.—An acute or subacute inflammation of the voluntary muscles, and generally recognized as being due to micro-organisms or toxins produced by them.

Etiology.—This is a disease of adult life, and occurs more frequently in males than females. It is believed to arise from a micro-organism or to the influence of toxins, though no specific germ has as yet been found. It has occurred in the course of broncho-pneumonia, tuberculosis, and diabetes.

Pathology.—While all the voluntary muscles may be involved, the ocular and masseter usually escape. The muscular fibers are chiefly involved, though the interstitial may not escape. With the hyperemia, there is marked exudation of the leukocytes, the tissues become swollen, and, as fatty degeneration takes place, they assume a yellowish-white color. Hyaline degeneration sometimes occurs, and hemorrhage may be observed. The muscles are usually quite friable.

Symptoms.—The disease comes on gradually, the muscles of the extremities being the first to be involved, followed in turn by those of the trunk. The muscles become swollen, stiff, and painful, interfering with locomotion, and are tender when palpated, and slight edema is sometimes present. As the disease progresses, general edema may take place, while an erythematous eruption may appear, attended by more or less pigmentation.

There is general systemic disturbance, as shown by headache, nausea, and vomiting, fever of moderate intensity, and enlargement of the spleen. As a result of the impaired action of the muscles, respiration and deglutition may be greatly impaired.

Bronchitis, broncho-pneumonia, tuberculosis, and diabetes may develop during the course of the disease.

Diagnosis.—The clinical symptoms of trichiniasis are so nearly identical that a microscopical examination of the diseased muscle will be necessary to distinguish the one from the other.

Prognosis.—The disease generally terminates fatally in from one to three months in the acute form, or from one to three years in the chronic form.

Treatment.—The treatment will be symptomatic. Where sepsis is prominent, the well-known antiseptics, echinacea, baptisia, the chlorates, sulphites, and mineral acids, will be used.

PROGRESSIVE OSSIFYING MYOSITIS.

Definition.—Either a local or general myositis, in which a progressive ossification takes place in the affected muscles.

Etiology.—Like acute myositis, the cause is unknown, though young men are more frequently affected than women.

Pathology.—The early changes that occur are the same as those of acute myositis, the later changes being those of calcification, which render the muscles and joints stiff and immobile. The process in rare cases extends to the heart.

Symptoms.—The additional symptoms to acute myositis are immobility of the muscles and joints.

Diagnosis.—This is made by the hard, stiff condition of the muscles, and finally by ankylosis of the joints.

Treatment.—The treatment has been unsatisfactory, and can be only palliative.

MYOTONIA.

Synonym.—Thompson's Disease.

Definition.—A hereditary disease of the muscles characterized by prolonged contraction of the muscles whenever voluntary motion is attempted, contraction and relaxation being slow and the muscles stiff.

Etiology.—Heredity is an important factor in the causation of the disease, Thompson, who first described the disease, having

traced the affection in his family for five generations. It occurs more frequently in men than women, and usually in those whose families are characterized by neuropathic tendencies. Prolonged, severe exertion has been followed by the disease where no history of the affection could be traced in the family. It has also been attributed to cold and fright, where the patient has been of a neurotic temperament.

Pathology.—The muscle fibers are hypertrophied, especially in their transverse diameter.

Symptoms.—The most characteristic symptom of this rare disease is that, upon voluntary movement, the contraction of the group of muscles which the patient desires to move is slower than normal, and when once contracted they remain so for several seconds. The muscles of the hand and leg are the most commonly affected. If of the hand, the patient readily grasps the object desired, but for some seconds is unable to let it go, and, even when relaxed sufficiently to permit the object to be released, the fingers remain, for a few seconds, partially contracted.

If of the leg, and the patient attempts to walk, he is unable to take a second step for several seconds owing to the tonic contraction and stiffness of the muscles; the first few steps are therefore a halting gait; with each step, however, the contraction becomes less marked till the normal gait is assumed and the patient may walk indefinitely in a natural manner, provided he does not rest for a considerable period. It is only after a period of rest that the contraction occurs.

All the voluntary muscles may be involved, though the muscles of the face are usually exempt. The muscles of deglutition and the sphincters are never involved.

The reflexes are not constant, being sometimes exaggerated, diminished, normal, or even absent. There is generally an absence of pain.

The mental disturbance is only such as would be natural to one of his condition, his anxiety causing more or less irritability.

Diagnosis.—This is readily made by carefully observing the tonic contraction of the muscles, which grow less with each muscular movement, till normal action is restored, to become rigid again after a rest.

Prognosis.—This is unfavorable, for though in rare cases

there is a temporary arrest of the disease, its return is certain. It does not necessarily shorten life, though accidents are more common to those with this affection.

Treatment.—No treatment has as yet proven of much benefit. Massage and electricity have been used with doubtful benefit. Exposure to cold, and mental worry, aggravate the disease, hence should be avoided as far as possible.

PROGRESSIVE MUSCULAR ATROPHY.

Such a close relationship exists between the various clinical varieties of muscular atrophy and the form previously described, where there is a degeneration of the ganglion cells of the anterior horns of the spinal gray matter, and since some authorities contend that, in all forms of progressive muscular atrophy, there is some affection of the nervous system, I have not considered it worth while to devote more space to this subject. (See page 875.)

PARAMYOCLONUS MULTIPLEX.

Synonym.—Myoclonia.

Definition.—A disease of the muscles, first described by Friedrich, in which there is clonic contractions, principally of the extremities, and occurring constantly or paroxysmally.

Etiology.—The etiology of this rare disease is unknown. It occurs more frequently in males than in the opposite sex. Heredity may bear some part as a predisposing factor, since the disease is found more frequently in those of a nervous temperament.

Traumatism, overwork, exposure to cold, fear, and great mental disturbances have been considered as exciting causes.

Pathology.—The pathology is unknown, no characteristic lesion having been as yet discovered. It is supposed to be closely allied to convulsive tic, and possibly there may be some disturbance in the motor cells in the cortex and cord.

Symptoms.—The most characteristic symptoms are sudden paroxysmal contractions, of a clonic character, of a group of muscles. The contractions vary from fifty to one hundred and fifty per minute, and are usually bilateral. They are the most pro-

nounced in the muscles of the trunk, and hips, though those of the arms, legs, and face, are sometimes affected.

The contractions are so severe in some cases as to throw the patient from the chair or bed, and in rare cases are tonic in character. The tendon reflexes are increased, and any irritation of the skin or an electric shock, brings on an attack.

Diagnosis.—The sudden, lightning-like contraction of the muscles is the chief diagnostic sign.

Prognosis.—This is favorable in most cases, a spontaneous cure not infrequently resulting.

Treatment.—The disease has thus far been unaffected by treatment.



PART X.

THE INTOXICATIONS; SUN-STROKE; OBESITY.

THE INTOXICATIONS.

ALCOHOLISM.

Definition.—An intoxication, acute or chronic, due to the ingestion of a sufficient quantity of alcohol to produce muscular inco-ordination, mental disturbances, and finally narcosis. Certain terms are used to define peculiar conditions or phases of alcoholism, such as *mania-a-potu*, *dipsomania*, and *delirium tremens*.

Mania-a-potu is a temporary acute insanity, or “crazy drunkenness,” occurring in a drinker of neurotic temperament.

Dipsomania is where there is a strong hereditary tendency to drink, and where the victim goes on a spree periodically, but during the intervals is free from any craving for drink.

Delirium tremens is where certain hallucinations are experienced, generally of a fearful character, such as being pursued by *snakes*, demons, vicious animals, etc., and is generally found in chronic alcoholism, though sometimes met with in the acute form.

Etiology.—Among predisposing causes may be mentioned the following:

Heredity, the offspring of drinkers often being of a nervous temperament, which craves stimulants.

Occupation, in which there is exposure to inclement weather, as by soldiers, sailors, cab-drivers, hucksters, etc. Those engaged in the manufacture and sale of liquors are also peculiarly exposed.

Grief and Despondency.—The loss of family or fortune results in broodings, which predispose the individual to dissipate

his troubles by drink. Pain and failing health are often the first conditions that drive to drink.

Social Customs.—The custom of serving wines of various kinds at banquets is often the beginning of the drink-habit.

The exciting cause is either the intermittent or continued use of whisky, wine, or beer, and in females cologne-water.

Pathology.—*Acute Alcoholism.*—Where death is the result of acute alcoholism, the mucous membrane of the gastro-intestinal canal is engorged, injected, and dark-red in color, and covered with a sticky, mucoid exudate. The brain and the kidneys show the same characteristic changes. A recent case of a young colored boy of eighteen, who drank two quarts of whisky on a wager and died twenty-four hours later, revealed the above conditions, which is typical of acute alcoholism.

Chronic Alcoholism.—In chronic alcoholism, changes of a more permanent character take place, depending somewhat upon the quality, and quantity, and kind of alcoholics consumed, and length of time used. While all the bodily tissues are more or less impaired, the brain, kidneys, and digestive system suffer most.

Spirituous liquors show connective-tissue changes, while malt drinks are more apt to result in fatty degeneration. Thus, in whisky-drinkers, chronic gastritis, with thickening of the mucosa, will be found.

The kidneys and liver are firm and sclerosed, due to fibroid degeneration. The brain, spinal cord, and arteries also show similar changes. In beer-drinkers, there is apt to be fatty degeneration of the kidneys, liver, and heart, and more or less dilatation of stomach.

Symptoms.—The symptoms of acute alcoholism have a wide range, affecting different temperaments in very different ways. In one, a spirit of generosity is early developed, the victim spending his substance with a lavish and prodigal hand. Another will be jovial, and endeavor to amuse his companions, while a third early develops a pugnacious attitude, is quarrelsome and vicious.

The first effect of *drink* is one of stimulation and exhilaration, attended by vascular relaxation, which is accompanied by a sense of warmth, the face being flushed and rosy. As the system becomes more impressed by the intoxicant, the drinker passes into the second stage; there is now muscular inco-ordination, a more

cyanotic appearance of the face, and the speech is maudlin or delirious. This is followed by the third stage, in which helplessness, acute coma, heavy, stertorous breathing, a slow, full pulse, dilated pupils, a purplish, bloated countenance, relaxed, clammy skin, and frequently incontinence of urine and feces, are the prominent symptoms.

The coma is usually not so profound but that the patient may respond to repeated shakings or pressure upon the supraorbital notch, though his mutterings are unintelligible. Acute alcoholism may stop short of the third stage, especially if but little of the stimulant is taken.

Mania-a-potu.—In some neurotic individuals a few drinks are sufficient to develop a *maniacal* condition, characterized by an ungovernable temper, the *demon* of drink carrying everything before it. The face is flushed, the pulse full and bounding, with great excitation of the nervous system, which manifests itself by unearthly screams or destructive tendencies. Thus, in the case of Mr. A——, a farmer of industrious habits and peaceful mind, a few drinks of whisky, on coming to town, transformed him into a veritable fighting demon. His arrest and incarceration could only be accomplished by the aid of half a dozen assistants, which was followed by unearthly yells and cursings, until he was completely exhausted.

Mr. B——, an industrious carpenter, only needed a few drinks to make him “crazy,” when he would undertake to beat his wife and children and demolish the furniture, and by the time he could be overpowered, his home looked as though visited by a cyclone.

Chronic Alcoholism.—The disease—for so it must be considered—comes on insidiously, gradually undermining the vital forces, and inflicting both moral and physical ruin.

The victim of chronic alcoholism loses his industrious habits, and as slight exertion results in fatigue, loss of energy and unwillingness to work replaces the habit of thrift. General and mental depression follow, headache, malaise, and impaired appetite, with a dirty, furred tongue, a characteristic bad breath, resembling the mash-tub, constipation, alternating with diarrhea, insomnia and muscular tremor, are among the earlier symptoms.

Digestive disturbance is almost constant, the patient vomiting before breakfast, and suffering with gastric distress after eating.

Thirst is excessive, but only partially relieved by drinking. Tremor of the hands and tongue is soon noticed, and though at first it can be controlled, soon passes beyond the power of the patient, even affecting his gait, which becomes ataxic.

The muscles are flabby, there is a venous congestion of the face, and acute rosacea paints the drinker's nose a purplish red. In beer-drinkers, dilatation of the stomach is quite common. The mental or moral sensibilities are blunted, the will and conscience are paralyzed, and falsehood and deceit replace truth and fair-dealing.

As the physical, mental, and spiritual forces give way, there is less resistance to diseased conditions, which accounts for the high mortality, in pneumonia, influenza, dysentery, and kindred diseases, occurring in alcoholics.

Delirium Tremens.—Although this may follow a single attack of a hard and prolonged spree, it is more apt to occur in chronic drinkers. In some cases delirium tremens is not the result of excessive excitement, but makes its appearance when the person has ceased to drink, either from inability of the stomach to receive it, or because they desire to sober up. Hence it is the withdrawal of the stimulant at a time when the system is accustomed to its use. In other cases it comes on while the person is still drinking to excess. There is therefore a delirium of drunkenness following the debauch immediately, and another that makes its appearance in from two to seven days afterwards.

"In the first case, the person has ceased to drink, and the excitement of the nervous system is dependent upon the withdrawal of the stimulant. It may commence as early as the second day, or at any time during the week after ceasing the use of stimulants.

"The symptoms are those of prostration. We find that there is great irritation of the stomach, frequently thirst, sometimes nausea, and in all cases an entire loss of appetite, the patient having usually taken but little, if any, food for several days. The pulse is generally slow, and the hands and feet are cold and clammy; he is anxious and dejected, sighs frequently, and complains of oppression about the precordia. These symptoms continue sometimes for two or three days, at others for but a few hours. The restlessness and vigilance of the patient are now increased, and the countenance has a peculiarly wild expression;

mental delusions now occur, at first at intervals, and easily displaced by reasoning with him, but at last, becoming fixed and constant, he sees curious shapes and beings, snakes, devils, dragons, assassins, etc., and is in continual fear of his life, or of future retribution.

"It is singular that these visions are so generally frightful, and strike the poor sufferer with mortal terror, and yet the cases are very rare where it is otherwise. He sees them on his bed, peeping and laughing at him from behind the furniture, grasping at him from the air, climbing on his body, and it is impossible to displace these fancies. Occasionally they take human shapes, but are still objects of terror, as murderers, thieves, etc., and he tries various means to escape from their clutches, even in some cases to jumping out of the window.

"The intensity of this delirium varies in different cases, the patient being managed with ease in some, but in others requiring to be held down in bed to prevent him from injuring himself and others. During this time the skin is harsh and dry, the pulse frequent and small, the tongue dry and furred, and the appetite entirely lost. The secretions are all diminished, the patient is feeble, and there is an unnatural tremor of the muscles. Continuing in this way for a variable period, it may terminate by a subsidence of the excitement, and by a deep sleep, from which the patient awakes free from these morbid fancies. In other cases the delirium becomes more and more severe, until finally the system sinks under it, the patient dying from the fourth to the twelfth day.

"In the second case the delirium comes on as a termination of the spree, the person continuing to drink even after the attack has commenced. In some the drunkenness assumes a violent form, the patient being furious, vicious, and controlled with difficulty. When we examine the case we find the face flushed, the eyes bright, the pupils contracted, the pulse hard, and the patient irritable and with difficulty controlled. The evidence of delirium tremens is the same as above noted, for in all cases the phantoms are frightful. In this, however, the patient does not suffer quietly, but manifests a disposition to resist and combat the evil shapes. At last, when the hallucinations are continuous, the patient is in a constant state of furious excitement, which contin-

ues until the nervous system gives way and death results." (Scudder.)

Diagnosis.—Acute alcoholism is not usually difficult to recognize, though a *careful* examination should be made of each case, since apoplexy, concussion of the brain, and uremic coma have been taken for a case of "dead drunk." In an acute coma from drink, the breathing will be heavy or stertorous, and by vigorously shaking the person, or by pressing hard upon the supraorbital notch, the patient can be aroused, and though his mutterings may not be very intelligible, we recognize that the impressions are made upon the brain.

The whisky-breath also corroborates the other symptoms. We are not to overlook the fact, however, that the patient may have fallen in an attack of apoplexy, or from a blow on the head, and whisky or brandy has been given by the bystanders in an effort at resuscitation, or the patient may have had a drink or two before an attack or an injury, in which case the whisky breath should not deceive us.

The diagnosis of chronic alcoholism will be made from the history of the case; the tremor of the hand and tongue; the furred tongue; bad breath and gastric irritability; the bloated face, red nose, and the disturbed mental or moral condition of the patient.

Delirium tremens will be recognized by the history of the case, the marked uneasiness and restlessness of his manner, and the peculiar wildness of his countenance; the seeing of unpleasant and hideous things can hardly be mistaken for any other condition.

Mania-a-potu will be recognized by the violent fury of the individual while under the influence of drink.

Prognosis.—In acute cases the prognosis is generally favorable, unless large quantities of whisky are taken, when death may result in a few hours.

In chronic alcoholism, permanent recovery seldom takes place, owing to progressive changes in brain, kidney, liver, gastrointestinal canal, and, in fact, the tissues generally. Even though the individual permanently abstains from the use of spirituous and malt liquors, tissue changes can not be removed entirely.

Bright's disease, insanity, epilepsy, cirrhosis of the liver, and other serious lesions are apt to result.

Treatment.—The treatment for acute alcoholism is quite simple. If seen before the patient reaches the stage of coma, an emetic, followed by teaspoonful doses of liquor ammonia acetat, every thirty or sixty minutes, will generally straighten or sober up the patient; the patient, of course, abstaining from the fresh use of drink. Howe's viburnum cordial and nux vomica should be given for several days. If the patient has reached the stage of coma, he will sleep off the effects of his drunk, when the above remedies may be effectively used.

There is not only a physical degeneration, but a mental and moral one as well, and chronic alcoholics do better when placed in special retreats or homes for the inebriates. The patients tolerate the withdrawal of stimulants better than when at their own home, and they are encouraged by the presence of convalescents, and their will is strengthened, and by the judicious use of tonics, iron, strychnia, gold, and like preparations, a certain per cent are permanently cured.

The general health must be looked after, and nutrition improved. Exercise in the open air, baths, massage, and a good tonic, such as the triple phosphate of iron, quinine, and strychnia, will prove beneficial. To induce sleep, passiflora in teaspoonful doses, trional, gelsemium, and hyoscyamus should be given in preference to opiates; in fact, the physician should avoid opiates, as he would whisky, for the danger of acquiring the drug habit is very great.

The patient is to be encouraged, his will strengthened, and his moral and spiritual nature cultivated. Unfortunately, there is no specific drug for alcoholism. If the patient can be interested in philanthropic work, such as rescuing other unfortunates, much good will result.

In treating delirium tremens, we find two directly opposite conditions. In one there is *enfeeblement*; the pulse is small and frequent, the face is pallid, there is great prostration, the extremities are inclined to be cold, and the hallucinations are terrifying. Such a patient needs stimulants, tonics, and restoratives. Alcoholic stimulants, however, should be withheld. Acetate of ammonia, nux vomica, strychnia, hot broths, highly spiced, and the hot bath are followed by happy results. Where the stomach is too irritable to retain foods, an enema of hot beef-tea, will often be received and accomplish much good.

Where there is great excitation, with flushed face, full bounding pulse, throbbing of the carotids, and great nervous excitement, as shown by the wild active delirium, the treatment will be directly the opposite of the above. Veratrum and gelsemium, one dram of each, in a half glass of water, and a teaspoonful every thirty or sixty minutes, will bring about good results. This may be followed by choral ʒii, morphia grs. ii, aqua ʒii. Teaspoonful every hour until the patient drops asleep, and the battle is won.

The after treatment in each case will be along rational lines. In one it will be belladonna, nux vomica, hydrastis, quinine, etc. In the other, gelsemium, rhus, passiflora, etc.

MORPHINISM.

Synonyms.—Opium Inebriety; Morphine Habit.

Definition.—A chronic intoxication due to the habitual use of opium, or some of its alkaloids, especially morphin.

Etiology.—The most common cause, in our own country, is the frequent use of morphia as a pain reliever, or to overcome insomnia. Physicians are many times responsible for creating the habit, by the frequent and persistent use of morphia to overcome pain.

Women are more frequently the victims than men. Physicians and druggists make up the greater number of male patients, Mattison reporting seventy per cent to be medical men.

In China, India, Persia, and Turkey, opium-growing countries, the opium habit is as common as alcoholism in Europe and America.

Pathology.—There are no characteristic tissue changes in opium inebriates, other than that due to indigestion and malnutrition. In time the patient becomes anemic, the skin dry, sallow, and inelastic, the heart and blood-vessels show the effects of poor nutrition, and the tissues generally present a starved appearance.

Symptoms.—Several months may elapse before the symptoms are sufficiently marked as to be noticeable. Susceptibility to the drug rapidly decreases, so either larger doses or the same size doses must be taken at more frequent intervals. Gradually

the patient takes on a peculiar anemic or gray color; the skin is dry, harsh, and inelastic; the muscles are shrunken; the eye is listless; the patient complains of languor, is listless, or when not under the influence of the drug is restless, irritable, and is troubled with insomnia. Not only physical weakness results, but, what is still more deplorable, there is moral degeneration. The patient forms the habit of lying, and practices deception on all occasions.

The patient complains of frequent pain in the cardiac region, and palpitation, difficult breathing, and cramping of various muscles are common symptoms. Shortly after taking the drug, an intolerable itching frequently occurs. Males are usually sexually impotent, while females are prone to abort.

When the drug is used hypodermically, the arm or leg shows many scars from the needle, and the blue cicatrices of former abscesses.

Diagnosis.—The diagnosis, where possible, is made from the history of the case, and where this is impossible to get, owing to the lying habits of the victim, the above symptoms must be carefully noted, and a close watch placed upon the patient.

Prognosis.—The prognosis is unfavorable in confirmed cases, when treated by the general practitioner. Where the patient can be isolated and attended constantly by a firm companion, or placed in a retreat for opium inebriates, the prognosis is more hopeful.

Treatment.—The diet should be generous, easily digested, and nourishing; the patient should be much in the open air, with regular exercise; the mind should be occupied by congenial work, and, above all, a rapid withdrawal of the drug. Not total abstinence from the first day of treatment, but a gradual reduction each day, until by the end of a week, a total withdrawal should be effected. *Nux vomica*, *hydrastis*, and *strychnia* will serve a good purpose as a tonic to brace the patient. *Passiflora* in teaspoonful doses, *sulfonal*, and *trional* may be useful in securing sleep. *Gelsemium*, baths, and massage will afford relief to the various aches and pains complained of by the patient.

Above all, the patient is to be attended by a companion, who is never to relax his vigilance for one moment, in order that the patient may be saved from surreptitiously securing the destroying drug.

The moral nature of the patient is to be strengthened and encouraged by engaging in plans to help those who may be even more unfortunate than himself. Due care must be taken to prevent the patient from taking any substitute, such as choral, cocaine, hyoscyamus, the bromids, and like remedies.

PLUMBISM.

Synonyms.—Chronic Lead-poisoning; Saturnism.

Definition.—A chronic intoxication due to absorption of lead.

Etiology.—Individual susceptibility is much greater in some cases than in others, and sleeping in newly painted rooms, or drinking water flowing through lead pipes, has occasioned the disease.

The most common means of receiving the poison, however, is due to contact by workers in lead, such as paint manufacturers, painters, plumbers, workers in type-foundries, shot-makers, pottery-glaziers, lace-makers, calico-printers, glass-grinders, and the habit of dressmakers of biting off thread, some of which is lead-dyed.

It may be taken in the food, in which lead chromate is used to impart a rich yellow color, and may be found in bread, milk, butter, and candy. Chocolate, candy, and tobacco wrapped in lead-foil may also give rise to plumbism.

Women are more susceptible than men, and adults than children, though most likely on account of more frequent exposure rather than natural susceptibility.

Pathology.—The pathological changes occur in the peripheral nerves, muscles, kidneys, liver, mucous membranes, and blood-vessels.

The most constant changes are found in the peripheral nerves, the nerve-endings exhibiting a neuritis, to be followed by atrophy of the muscles. The cord is usually free from structural change, though degeneration may occur in patches, in the nerve-trunks. The atrophied muscles are pale in color, and, in advanced stages, show fibroid degeneration.

In lead-encephalopathy, arterio-sclerosis of the cerebral blood-vessels is found, which sometimes is followed by softening of the

brain, and by hemorrhages. Parenchymatous degeneration of the kidneys and liver is common.

Symptoms.—The symptoms vary, depending upon individual susceptibility, amount of lead absorbed, and the length of time of exposure. *Anemia* is an early and characteristic symptom, and usually of the chlorotic type. The hemoglobin may be considerably diminished, though the erythrocytes are rarely less than 3,000,000. There is impaired nutrition, with consequent loss of flesh and strength.

An almost constant and characteristic symptom is a blue line at the juncture of the gums with the teeth, and is due to the presence of lead sulphid, formed by the union of the lead in the blood with sulphuretted hydrogen, the latter resulting from the decomposition of tartar upon the teeth. If the patient's teeth be free from tartar, the blue line may be absent. The gums are frequently soft, swollen, and spongy, and there is a metallic taste, and the breath is fetid.

Gastro-intestinal symptoms are also characteristic, *lead colic* causing the most intense suffering. Commencing with an obscure pain near the navel, it radiates in every direction, until the entire abdomen seems involved. The pain is griping and excruciating in character, the patient not infrequently screaming in his agony. The pain may extend to the back, hip, thighs, and legs; in fact, no part of the body seems free from pain.

The abdominal walls are tense and hard, sometimes knotted, and the umbilicus is drawn inward. The bowels are not tender to pressure, neither does pressure alleviate the pain, as in some other forms of colic. The patient is frequently troubled with nausea and vomiting, the material thrown off the stomach being a slimy fluid, more or less mixed with acrid bile. The tongue is pale, broad, and flabby, and its movements controlled with difficulty; the skin is soft and moist, the pulse not at first affected, but when the disease is long continued and severe, it becomes soft, feeble, and increased in frequency.

The bowels are obstinately constipated; if anything passes, it is in hard scybalous masses, with a brownish water; the sphincters seem to be sometimes so contracted that neither urine nor feces can be passed, and it is with greatest difficulty that we can introduce the nozzle of a syringe.

Paralysis is common, especially that affecting the extensor muscles of the forearm, producing *wrist-drop*. Less frequently the deltoid, the biceps, the brachialis and pectoral muscles are involved.

Saturnine arthralgia, pain in the articulations, is not an uncommon symptom.

Cerebral symptoms, or lead-encephalopathy, occur where large quantities of lead are absorbed, and it is characterized by convulsions, delirium, coma, neuro-retinitis, and sometimes insanity.

Diagnosis.—The history of exposure to lead-poisoning, the blue line on the margin of the gums, the wrist-drop, the anemic



FIG. 54. Wrist-drop due to paralysis from lead-poisoning.

condition, and the *lead-colic* are such characteristic symptoms that the diagnosis is easily made.

Prognosis.—Unless degeneration of the heart and kidneys has taken place or severe cerebral symptoms develop, the prognosis is favorable.

Treatment.—"The first object of treatment is to mitigate the intense pain, and open the bowels, after which means to remove the lead should be immediately used. Among the most efficient means for the relief of pain is the administration of chloroform in doses of from twenty to thirty drops every half hour or hour; it may be administered in mucilage, water, rectified spirits, or,

what is preferable to all, glycerin. I usually order it in the following manner:

“R Chloroform ℥ss.
 “Glycerin ℥ij. M.
 “Sig. Shake well, and give a teaspoonful as
 often as required.

“If this can not be obtained, or fails, opium, belladonna, or hyoscyamus may be used in full doses in its stead. With this, alum in doses of ten grains every two hours, or iodid of potassium, in doses of one or two grains every hour, should be given as antidotes to the poison.

“To open the bowels, I prefer the use of enemata of compound powder of jalap and senna, or the same may be used internally, or a pill containing from half to one drop of croton oil, is recommended in bad cases; if the last were given, I should make the mass of extract of hyoscyamus, two to five grains. Sulphate of magnesia has been used for the same purpose, and is highly recommended, as is also the white liquid physic heretofore named.

“As a local application, chloroform applied to the abdomen is one of the most efficient; in using it, drop fifteen or twenty drops on a wet cloth, and apply for a few minutes and repeat. Hot fomentations have been used, but without much benefit, as has also the cold water bandage. A cataplasm of tobacco is highly recommended, and I have no doubt will prove useful.

“I prefer the warm bath to other means. If there are no facilities for giving an entire bath, a large wash-tub filled with water as hot as can be borne, the patient sitting in it, answers a good purpose. A bath containing the sulphid of potassium, in the proportion of four ounces to thirty gallons of water, is recommended for its specific influence. The use of electricity I know to be beneficial, not only in relieving the pain, but, in the form of a galvanic bath, in removing the metal from the system. In the anorexia and slight attacks of colic that are frequently met with in painters and other lead workers, I have found nothing better than sodium sulphate in small doses. I usually order a solution of half an ounce to four ounces of water, to be taken three times a day in doses of a tablespoonful.” (Scudder.)

ARSENICISM.

Synonym.—Chronic Arsenic Poisoning.

Definition.—A chronic intoxication caused by the continued absorption of arsenic.

Etiology.—Although a few cases result from eating arsenic for its exhilarating or narcotic effect, or to improve the complexion and to add brilliancy to the eyes, the great majority of cases are due to the slow absorption of the drug by persons employed in the industrial world, where this drug occurs.

Thus arsenical pyrites are found in silver, tin, copper, cobalt, and nickel ores, and, in the reduction of these metals, large quantities of arsenic is liberated, and the workmen exposed to it are poisoned. The use of Scheele's or Schweinfurth green by dyers, wall-paper workers, and artificial flower makers, is not an infrequent cause. Workers in glass, shot-makers, and taxidermists, also, are liable to arsenic poisoning.

Extremely susceptible individuals may be poisoned by living in rooms where the carpet, wall-paper, draperies, ornaments, toys, etc., are colored with arsenic dyes. The disease may also be incurred by the administration of Fowler's solution.

Pathology.—Degeneration of the peripheral nerves similar to that occurring from lead is found, and occasionally the anterior horns of the spinal cord undergo the same changes.

Symptoms.—The most characteristic symptoms of arsenic poisoning are anemia, catarrhal symptoms, cutaneous eruptions, and those due to neuritis. The patient gradually assumes an ashen-gray or white color, with loss of flesh and strength, the anemia being of the chlorotic type. The eyelids become puffy, especially when the poison is due to Fowler's solution.

Catarrh of the upper respiratory passages is common, coryza being a chief symptom. Gastro-intestinal catarrh is manifested by nausea, especially by pain and diarrhea. Cutaneous eruptions are common, such as urticarial, eczematous, herpetic, and pemphigoid. A bronze pigmentation is sometimes seen. The most characteristic symptoms of arsenic poisoning, however, are those arising from neuritis, and as a rule are more marked in the leg extensors and peroneal muscles. There may be, in the earlier stages, a hyperesthesia of the nerve-trunks and muscles, followed by per-

verted sensibilities (paresthesia), the patient experiencing a numb, tingling, or crawling sensation, to be finally replaced by anesthesia.

Paralysis of the lower muscles is frequent, and rapid atrophy of the muscles may take place. The sphincters of the rectum and bladder are not usually affected.

Diagnosis.—The history of the source of poisoning, together with the characteristic symptoms already noted, render the diagnosis comparatively easy.

Prognosis.—Although a chronic affection, the disease is generally amenable to treatment.

Treatment.—A removal from the exciting cause, such as change of occupation or withholding the drug, is, of course, absolutely necessary. Gastro-intestinal irritation will be relieved by small doses of ipecac, bismuth subnitrate and mint-water, peach-tree infusion, and remedies of a sedative nature.*

As soon as the hyperesthesia is overcome, electricity and massage will be beneficial for the neuritis and paralysis. To eliminate the arsenic, iodid of potassium is regarded as a specific. The nourishment should be liquid, bland, and easily digested.

MERCURIALISM.

Synonyms.—Ptyalism; Chronic Mercurial Poisoning.

Definition.—A chronic mercurial poisoning, caused, either by ingestion of the drug, or by inhalation or absorption of the mineral in the industrial pursuits.

Etiology.—Ptyalism from calomel has become quite rare in recent years, since this much abused drug has found its legitimate use in medicine; however, to one peculiarly susceptible to the drug, small doses may give rise to mercurial poisoning.

The most common cause is the inhalation of the vapor of the mineral by workmen engaged where this mineral is used; thus workers in quicksilver-mines, especially those in smelters, also mirror-gilders, makers of thermometers and barometers, and all who use the salts of mercury in the various trades.

Pathology.—No marked changes are found in either the central or peripheral nervous system. Acute inflammation of the mouth, stomach, and bowels are the most constant lesions found. Irritation, and frequently inflammation of the kidney, is also noted in some cases, while degeneration of the liver is not an uncommon sequence.

Symptoms.—The early symptoms are swelling of the gums, which become tender, soft, and spongy, to be followed by ulceration. The breath is offensive, and a metallic taste is usually present. Ptyalism is a characteristic symptom. The teeth become loosened, and sometimes fall out. Necrosis of the jaws may occur in severe cases.

Diarrhea, with abdominal pains, is usually present. The urine becomes scanty, high-colored, and contains albumin and casts.

Tremors are characteristic, and are generally first noticed in the tongue and lips, but gradually affect the entire voluntary muscular system.

Paralysis of the various muscles may occur, though they do not atrophy. Arthritic pains are experienced, and the patient gradually becomes anemic and emaciated.

Diagnosis.—Given the history of exposure to the metal, or ingestion of the drug, together with the stomatitis, ptyalism, ulceration, tremors, paresis, etc., and the diagnosis is easily made.

Prognosis.—The prognosis is generally favorable.

Treatment.—If due to the use of mercury, the drug must, of course, be withheld; and if due to exposure in any of the industrial pursuits, the patient must be removed from the offending cause. As a wash for the stomatitis, potassium chlorate and hydrastine phosphate is almost a specific. The same agents are also of much benefit given internally.

R Phytolacca.....gtt. xx to xxx.
 Waterʒiv. M.
 Sig. Teaspoonful every two hours will give
 good results.

To aid in the elimination of the mineral, potassium iodid may be used, and sulphur-baths practiced. Galvanism is also useful in eliminating the drug.

POISONING BY INFECTED FOOD.

Synonym.—Ptomain Poisoning.

Definition.—An acute poisoning, due to the ingestion of food in which putrefactive changes have already taken place; or the food taken may contain pathogenic micro-organisms which develop toxic conditions after being swallowed; or, lastly, the food may be in good condition when swallowed, but undergoes putrefaction in the large or small intestine, as when food is eaten hurriedly, while the patient is overexcited, overheated, or exhausted.

Ptomain poisoning, but little heard of a few years ago, is almost of daily occurrence, owing, no doubt, to the large consumption of canned goods, in which carelessness in the selection, preparation, and handling of the foodstuffs is an important factor; or the animal may be killed when suffering from some disease. The delivery of milk from long distances during the hot summer months may also be fruitful sources of poisoning.

Meat-poisoning.—Tainted meats, such as warmed-over meat-pies, pork, veal, etc., and mincemeat, sausages, chicken salads, head-cheese, and various canned meats, are responsible for violent symptoms of poisoning.

Symptoms.—The symptoms are those of acute gastro-enteritis, and usually come on suddenly. Sometimes the initial lesion is a chill, followed by fever. The patient is seized with sharp, colicky pains, and there is vomiting and purging, with severe cramps in abdomen and legs. In severe cases, prostration early follows; the pulse becomes small and frequent; the extremities become cold; the skin relaxes, and is covered with a cold, clammy perspiration; the mind becomes dull; there is a disturbance of vision, the pupils are dilated; the face becomes pinched, and the patient passes into a collapse, which may be followed by death. The history of the case, with the above symptoms, renders the diagnosis comparatively easy.

Fish-poisoning.—Certain fish contain poison glands and ovaries, and the ingestion of these produces an intoxication. Thus, in Japan, the disease called "Kakke," which prevails during the summer-time, is due to this cause, and the "*Clupea Venenosa*," a fish found in the West Indies, is considered poisonous from a similar cause. In middle Europe, especially in Germany, the eat-

ing of sick "barbels" gives rise to severe gastro-enteritis known as barbel-cholera, while in Russia fish-poisoning often results from eating sturgeon and salmon suffering with an infectious disease peculiar to these fish.

In our own country, the use of tainted canned fish, eels, mussels, crabs, oysters, lobsters, etc., is followed by toxic conditions. The symptoms are similar to those already mentioned for meat-poisoning.

Milk-poisoning.—In 1884, Vaughan discovered a specific chemical poison in milk and its products, and called it tyrotoxicon, and the excessive death-rate from summer complaint in bottle-fed babies can be traced many times to the chemical changes which have taken place in the milk. This poison also occurs in cheese, ice-cream, frozen custards, cream-puffs, and other articles if made from infected milk.

The symptoms of all these ptomain-infected foods are similar; namely, those of gastro-enteritis, and vary only in degree, according to the stage or degree of toxicity of the infecting principle.

Prognosis.—The prognosis is generally favorable.

Treatment.—The first object is the removal of the offending material, though nature generally is the first to come to the patient's assistance by producing free emesis and catharsis. If, however, this has not taken place, the stomach should be thoroughly washed out by copious libations of warm saline solution, mustard-water, lobelia infusion, or powdered ipecac, to be followed by castor-oil or Epsom salts.

To overcome the gastric irritability, small doses of specific aconite and ipecac, or gelsemium or rhus tox., should be given. An infusion of neutralizing powder will afford relief when the irritability is of unusual severity. Bismuth subnitrate and mint-water will also be useful for this painful and unpleasant symptom. Should there be threatened collapse, stimulants would be in order.

For the poisonous effects of the ptomains, echinacea, sodium sulphite, potassium chlorate and hydrastin, and such other anti-septics as the symptomatic conditions called for, would be used.

SNAKE-POISONING.

Although there are quite a variety of snakes found in the United States, there are only two, the bite of which is attended with danger. That of the "rattlesnake" (*Crotalus horridus*), and the "copperhead" (*Ancistrodon contortrix*).

Symptoms.—The rapidity of infection from a snake-bite depends upon the way the venom is introduced. Thus, if the bite be in the subcutaneous tissues, the poison is more slowly absorbed, and a longer time is required for the characteristic symptoms; but if a vein be penetrated in the biting, the symptoms are noticed in a few moments. If taken by the mouth, as in sucking the poison from the wound, the poison is said to be harmless, unless there be an abrasion of the mucous surfaces of the digestive tract.

Upon inoculation of the poison, severe pain takes place in the wound, and the parts rapidly become swollen, tender, and discolored. Constitutional symptoms early develop and great prostration ensues; the pulse is small and frequent, the pupils are dilated, a cold sweat appears, there is nausea and vomiting, and the patient staggers when attempting to walk. Death may occur in ten or twelve hours.

Treatment.—In 1871, Dr. H. C. Myers began the use of echinacea for the venom of the rattlesnake. The Sioux Indians had successfully made use of the scraped root for rattlesnake-bite, and Dr. Myers began investigating the action of the drug. So favorably was he impressed with its efficacy, that, after collecting several hundred cases of recovery in man and beast, he began experimenting upon himself. He injected the venom of the rattlesnake into the first finger of his left hand; the swelling was very rapid, and in a few hours extended to the elbow. Six hours after the introduction of the poison, he took a teaspoonful of the tincture, bathed the parts thoroughly with the same agent, and went to sleep. Five hours later he awakened free from pain, and a disappearance of the swelling.

In the absence of echinacea, whisky is usually freely given. No matter what agent be used, it is a good plan to extract as much as possible of the poison by sucking the wound and spitting out the poison, though there is but little danger from swallowing the virus, if the mucous surfaces are not abraded.

Echinacea has been successfully used in the bites of the tarantula and other venomous insects, and no doubt would be equally successful in poisoning from the bite of the copperhead.

HEAT-STROKE.

Synonyms.—Sunstroke; Coup de Soleil; Insolatio; Febris Solarie, or Sun Fever; Thermic Fever.

Definition.—Heat-stroke is the result of exposure to intense heat, either from the direct rays of the sun, or the radiation of blasts or furnaces, or to an overheated atmosphere.

Etiology.—Among the predisposing causes may be mentioned intemperance in drinking spirituous or malt liquors, physical or mental exhaustion, or anything that impairs the vital force or the resisting power of the body. A moist atmosphere, owing to interference with evaporation, and the consequent cooling of the body favors heat-stroke.

The immediate cause is always exposure to heat, either natural or artificial, and this excessive heat, acting upon the "heat center or vasomotor center or nerves," produces thermic fever, or heat exhaustion.

Lambert and Van Gieson hold to the theory that sunstroke is due to auto-intoxication, heat being only a contributing cause. Sunstroke occurs most frequently among bricklayers, roofers, masons, hod-carriers, teamsters, and soldiers upon hard marches, especially if they are *beer-drinkers*.

Heat-stroke occurs most frequently among stokers, workers in foundries, glassworks, boiler-rooms, laundries, and in all cases where the heat is confined.

Pathology.—Owing to the excessive heat of the body, putrefactive changes occur very early. If a post-mortem examination is made soon after death, the left heart will be found contracted, while the right heart will be engorged, and the venous trunks filled with dark semi-fluid blood. There is also venous engorgement of the brain, spinal cord, and lungs, and sometimes degeneration of the spleen and kidneys.

Granular degeneration of the ganglion cells of the brain and spinal cord has been observed.

Echymoses and extravasations of blood are found in the skin and mucous membranes, and also around the cervical sympathetic ganglia, the vagus, and phrenic nerves. The blood-corpuscles are crenated and show a diminished tendency to the formation of rouleaux.

Symptoms.—There may be prodromal symptoms, such as dizziness, intense burning headache, chromatopsia or colored vision, and a hot, dry skin. Usually, however, the attack comes on suddenly, and the patient loses consciousness. The breathing is stertorous, or shallow and rapid, the respiration varying from thirty to fifty per minute. The face is flushed or cyanotic, there is throbbing of the carotids, and the pulse is rapid, from 130 to 160 beats per minute. The temperature for mouth or rectum is rarely less than 108° , and may reach 113° or 115° . The skin is hot and dry, though later may become relaxed and bathed with perspiration. There is often clonic convulsions. The pupils are generally contracted, and the conjunctiva injected. Grinding the teeth is a common symptom. Incontinence of urine and feces occurs in a number of cases. Vomiting and purging may occur, and are to be regarded as unfavorable symptoms.

Diagnosis.—The circumstances under which the attack comes on, and the characteristic symptoms noted, render the diagnosis comparatively easy.

Prognosis.—In the severer forms of the disease, especially if not seen early, the mortality is high. Many cases recover slowly, and weeks or months elapse before the patient entirely recovers his mental and physical equilibrium. In some cases, the patient is never able to stand high temperature after once undergoing heat-stroke.

Treatment.—Prophylactic measures should be encouraged during the heated term. Alcoholics, and especially beer-drinkers, should be cautioned as to the danger of drinking stimulants during excessively hot weather, and those working in the sun should wear light clothing, and place a wet cloth or green leaves, preferably cabbage-leaves, in the hat. If dizziness is noticed, or the person exposed finds perspiration scanty or absent, he should immediately suspend work and seek the shade.

If the attack is mild, there may be only need for stimulants to overcome the sense of prostration. Belladonna, nux vomica,

cactus, carbonate of ammonia, strychnia, and like remedies will be used as they may be indicated.

In a more severe case, and where the temperature is very high, strip the patient of all clothing, and sponge him with *hot* water, at the same time have two or more assistants *fan* him vigorously. Any one who has not pursued this course will be surprised how rapidly the temperature will be reduced. The sponging with *hot* water determines the heat to the surface and the fan secures rapid evaporation. Aconite, rhus, gelsemium, and such sedatives as may be indicated should be given, but as a temperature-reducer, nothing equals the sponging with hot water, and the vigorous use of the fan. For nausea, an infusion of neutralizing powder with a little brandy, or bismuth and mint-water, rhus tox., ipecac, or peach-tree infusion, will be found beneficial.

OBESITY.

Synonyms.—Lipomatosis Universalis; Polysarcia Adiposa.

Definition.—An excessive accumulation of fat, impairing the bodily functions, or rendering the patient uncomfortable.

It is difficult to draw the line between the normal and abnormal amount of adipose tissue, though we may be safe in classifying an individual as obese whenever the fat becomes burdensome, and as soon as the function of any part becomes impaired thereby, it becomes a disease.

Etiology.—In obesity, as in most diseases, there are a number of predisposing causes, among which may be mentioned, first:

Heredity.—From fifty to sixty per cent of obese people can trace the condition to parents or grandparents.

Age.—While we meet with obesity in children, the most favorable time for an increase of adipose tissue is after the age of forty. The menopause also favors the deposit of fat.

Sex.—Women are more prone to obesity than men.

Race.—Corpulency is found more frequently among the Germans and Hebrew races, than among the English.

Disease.—Certain diseases predispose to obesity. Gout and diabetes, especially, may be named, and it is not uncommon to find this condition in chlorotic girls. It frequently follows typhoid fever, and develops after castration and ovariectomies.

Habit.—Sedentary habits are prone to result in obesity, since oxidation is deficient in all cases of corpulency.

The existing causes of obesity are undoubtedly due to over-eating and drinking, especially fat-producing foods, and the use of alcohol, beer, and sweet wines. While the carbo-hydrates and fats are more prone to produce obesity, even the albuminoids will give rise to the same condition when more is taken than is necessary for the daily waste. This is especially true when the patient leads to inactive life, since active muscular contractions lead to the decomposition of a large amount of fat. Strümpell says, in the daily ingestion of five or six glasses of beer, there is taken into the system, from this source alone, one-half the total amount of starch required by the system. The obesity of beer-drinkers is thus readily accounted for.

Pathology.—The subcutaneous cellular tissue is the first to receive the fatty deposits and the "*panniculus adiposis*" soon attains considerable thickness. The face becomes full, the neck enlarges, the double-chin develops, the chest broadens, and, in women, the breasts may become enormous, owing to fatty deposits. The abdomen becomes prominent, and as a result of overhanging portions, intertrigo of the groin, the under surface of the breasts, and between the nates, is common.

The internal organs also share in the general deposit. Thus, the mesentary, mediastinum, pericardium, and capsules of the kidney show the accumulation of fat. In more severe and serious cases, layers of fat are deposited about the heart, fatty overgrowth, and in the muscular structures fatty infiltration or degeneration occur. This is attended by impaired respiration and circulation, on slight exertion. Thus the breathing is rapid, the pulse small and feeble, or irregular. The same changes may take place in the liver and kidneys. We are not to understand, however, that these degenerations take place in all obese persons, for many fat people enjoy good health.

Symptoms.—For a time the only symptoms are those of inconvenience, and the increased fat may be somewhat burdensome; as the fat progressively increases, however, there is impairment in the respiratory and circulatory functions. On slight exertion, such as rapid walking, climbing a hill, or ascending stairs, the patient experiences difficulty in breathing, or as he

may express it, "is winded." The pulse becomes feeble on such occasions, and not infrequently is quite irregular. At times there is severe palpitation.

The appetite is often impaired and digestion feeble. Constipation is a common condition. Catarrhal conditions of the respiratory apparatus often follow obesity. In some there is mental lethargy, the individual being tired and sleepy. The temperature is often subnormal.

Diagnosis.—The only care in the diagnosis is to distinguish the complications when they exist.

Prognosis.—This is favorable when the patient is willing to subscribe to the dietary prescribed by his attendant, and will pursue *daily* systematic exercise, followed by the graduated bath.

Treatment.—The *most important* part of the treatment consists in pursuing such methods as will bring about the oxidation of the fat already deposited, and prevent the formation of new supplies. The most efficient means at our command to bring this about is exercise and diet.

In restricting the quantity of fat-producing foods, we are to be careful and avoid the mistake of too rigid a diet, or we will do injury to the body itself. When the individual is *weakened* by diet, a more generous list must be furnished.

Various diet lists have been suggested for the reduction of adipose tissue. Banting's, Ebstein's, and Oertal's being the ones most commonly used. Each list has its defects, and one can usually get better results by selecting parts of each than by adhering strictly to one. Banting's diet list is largely nitrogenous, the fat and carbo-hydrates being reduced to a minimum, and is as follows:

Breakfast.—Meat or fish, excepting pork or salmon, four or five ounces; tea, without cream or sugar; toasted white bread, about one ounce.

Lunch.—Meat, five or six ounces; vegetables, exclusive of potatoes; toasted white bread, one ounce. No farinaceous dishes, no champagne, port-wine, or beer; red wine, or sherry if desired, two or three glasses.

Afternoon.—Fruit, two or three ounces; a little toast; tea.

Evening.—Meat or fish, three or four ounces; red wine, claret, water, without limit.

Ebstein's diet allows twice the amount of fat, but restricts the carbo-hydrates, while Oertel favors less fat than Ebstein, but doubles the quantity of carbo-hydrates, and restricts fluids.

Banting's diet is, perhaps, theoretically the best, but unfortunately is not the most practical, for it is impossible for the body to maintain its metabolic equilibrium on an exclusive nitrogenous diet, and though the fat rapidly diminishes on such a diet, the patient grows weak, nervous, and sleepless. An exclusive nitrogenous diet also gives rise to gastro-intestinal disturbances, and various dyspeptic symptoms result. Although one can not prescribe the same diet for every obese person, a happy mean may be reached by combining portions of the three diet lists.

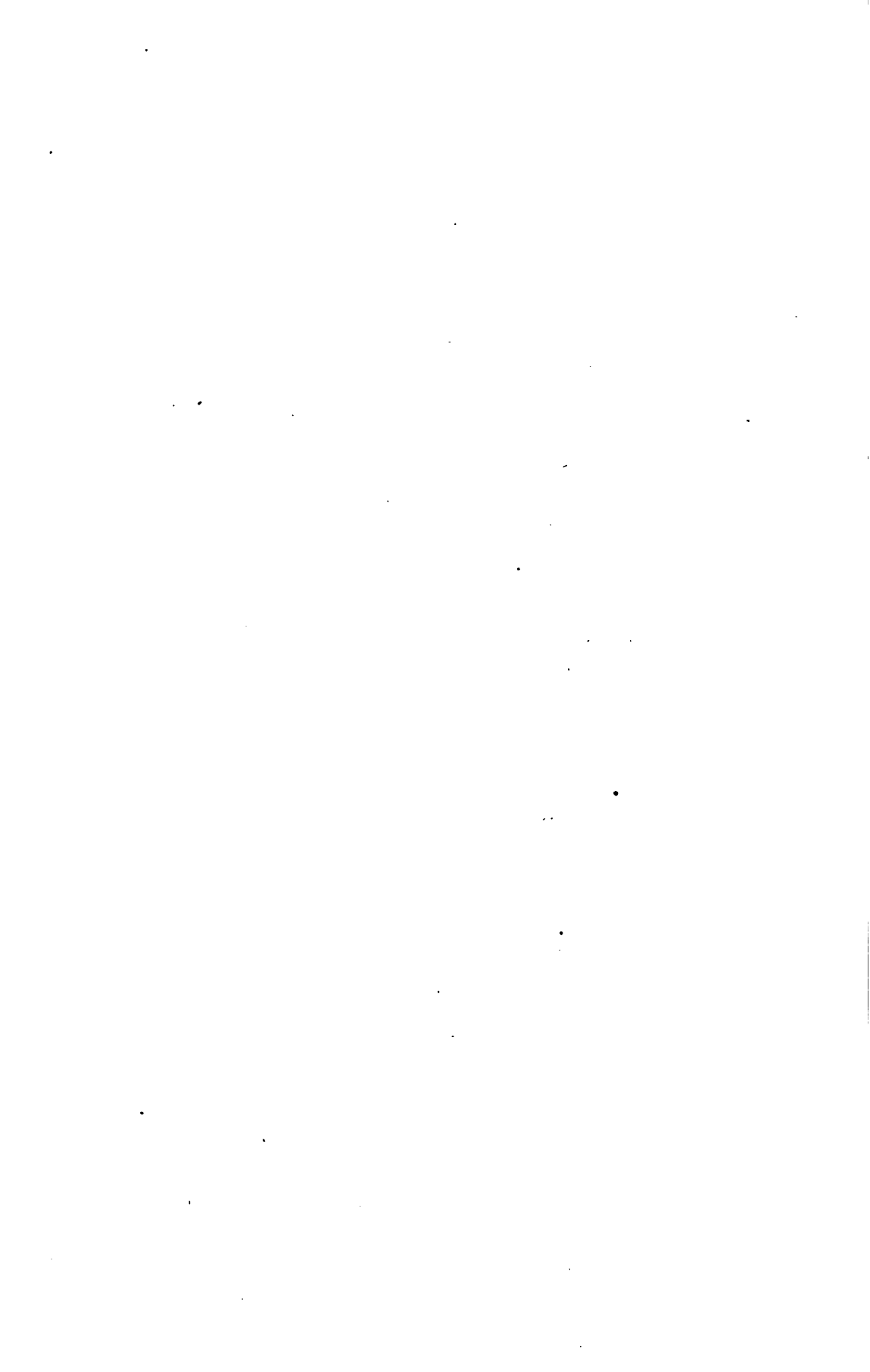
Thus, for *breakfast* an orange, a small bit of steak or fish, one ounce of toasted white bread, or shredded wheat biscuit, one cup of *clear* tea, no sugar or cream.

For *lunch*, steak or fish, four ounces; small piece of toast, or two rolls; *green* vegetables, fruit, and one cup of clear tea.

Dinner.—Steak, roast-beef, or fish, four to six ounces, or one or two eggs, green vegetables, fruit, and black coffee. Butter may be used moderately. Alcohol, beer, and wines should be prohibited, but water may be taken freely two hours after a meal. In some cases, water should be limited to one pint in twenty-four hours. Although the patient may be anxious for a rapid decrease in weight, the safer plan is to gauge the diet, so that the patient will lose from three to five pounds per week.

The patient should retire at 10 P. M., and arise at 6 A. M., eight hours being sufficient for fat people. He should take at least three baths a week, and, if robust, a daily bath. If the heart be good, cold baths are preferred; but when there is cardiac weakness, the hot bath should be recommended.

Exercise.—To increase oxidation, the patient must take daily exercise in the open air,—walking, horseback-riding, swimming, rowing, tennis; in fact, any exercise that will bring into play a large number of muscles and produce free perspiration. When there is cardiac feebleness, care must be taken that the exercise be not too long nor too severe. The medicinal treatment is not very satisfactory, though some reduction in weight may follow, usually, however, at the expense of the patient's strength; the most commonly used agents being the juice of the phytolacca berry, and thyroid extract.



PART XI.

ANIMAL PARASITES.

PSOROSPERMIASIS.

Psorosperms, also known as sporozoa, belong to the lowest form of *protozoa*, and owing to their being found within the cells are known as *cytozoa*.

The *ameba coli* belongs to the *protozoa*, and is associated with tropical dysentery, and is found in the stools and the coats of the intestines; also in tropical abscesses of the liver.

The *hematozoa* of malaria has been considered in the etiology of malaria, where they were classified with the *protozoa*.

Coccidium Oviforme.—This species of psorosperms occasionally gives rise to hepatic diseases in man, though in animals, especially in the rabbit, it is quite common. It gives rise to the formation of nodules or tumors in the liver, which may be of sufficient size to be palpable. The liver is quite tender, physical examination causing pain. There may be chills, followed by severe fever, terminating in death. When they invade the kidneys and ureters there is hematuria and a constant desire to micturate.

The *coccidium perforans* and the *coccidium bigeminum* infect the intestinal canal, giving rise to nausea, vomiting, diarrhea, and symptoms of a typhoid character.

External or *cutaneous coccidia* give rise to papillomatous developments of the skin, and are located on the face and abdomen. Coccidia are also found in Paget's disease of the nipple, and in carcinoma and epithelioma, but whether they possess any etiological significance has not yet been determined.

Treatment.—Aside from prophylactic measures, treatment has been experimental and not attended by very brilliant results. A thorough cleansing of such vegetables as greens of various kinds, lettuce, cabbage, spinach, water-cresses, etc., that possibly

may be contaminated from the excreta of rabbits and mice, is all-important in the prevention of the disease.

DISTOMIASIS.

Several forms of trematodes are found in animals; notably, the horse, goat, sheep, ass, rabbit, and other herbivorous animals, and occasionally they are found in man. The most important of these rare parasites are:

1. *Pulmonary Distomiasis*.—The Asiatica lung or bronchial fluke is found in China, Japan, occasionally in Europe, and one case has been reported to date, in the United States.

2. *Hepatic Distomiasis*.—Of the liver flukes, five species are found in man. It is said to be found quite frequently in China, Japan, and India, and a number of imported cases have been recorded in the United States.

3. *Intestinal Distomiasis*.—This intestinal fluke has been found in man in India, Egypt, and Japan.

Hemic Distomiasis.—Endemic hematuria is caused by the blood fluke, and is found in Africa, Arabia, Persia, India, and Egypt. The fluke is a flat worm, and may reach the length of an inch, and a third of an inch in width. The symptoms are referable to the various organs in which they are found, and are not sufficiently characteristic to be diagnostic.

Treatment.—The treatment has been unsatisfactory, since nothing has as yet been found that will kill the parasite.

NEMATODES.

Of the round worms most commonly found infesting the human body are the *ascaris lumbricoides*, *ascaris vermicularis*, *trichocephalis dispar*, and the *trichina spiralis*.

ASCARIASIS.

Synonym.—*Ascaris Lumbricoides* (long round worm).

Natural History.—This is found more frequently than any of the intestinal parasites, and though seen at any time of life, occurs most frequently in children under ten years of age.

It resembles the common earth or angle worm, is cylindrical, pointed at both ends; head slightly incurvated with a transverse contracture beneath it; mouth triangular; body transparent; color, light yellow or reddish, with a faint line down the side; gregarious, viviparous; from six to fifteen inches long in the female, and from four to eight inches in the male.

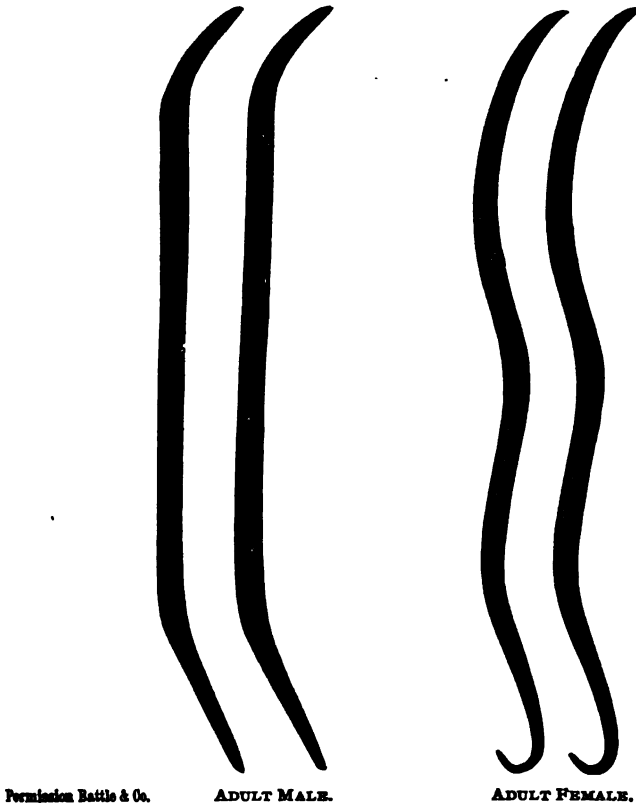


FIG. 55. ASCARIS LUMBRICOIDES.

It inhabits principally the ileum, but sometimes ascends into the stomach, and may creep out of the mouth and nostrils, or it may enter the trachea through the larynx. The hepatic ducts have been invaded, followed by abscesses, and cases have been reported where they have ascended the Eustachian tube, penetrating the tympanic membrane. Not infrequently they travel to the rectum and pass away at the anus.

Symptoms.—The child is generally poorly nourished, has a capricious appetite; the tongue is loaded with a moist, yellowish, dirty coating; there is an offensive breath and enfeebled digestion. The child is restless at night, tossing in his sleep, grits his teeth, starts in his sleep, frequently awakening in a fright. There is often seen a white ring around the mouth, and the child frequently picks its nose. In the afternoon the cheeks become flushed, and a slight fever makes its appearance.

While the above symptoms are usually regarded as pathognomonic, they may all be present and no parasites found, or they may all be absent and the child pass worms, the only positive "*signs*" being the passage of the parasites, which may be by way of the bowel or during a paroxysm of coughing.

A little patient of mine, suffering with whooping-cough, during a paroxysm of coughing, vomited freely, expelling three large worms, eight, ten, and twelve inches long, respectively, there being no suspicion of worms before their expulsion.

Complications.—The most serious complication will be obstruction of the bile-ducts, and would be recognized by jaundice and impaired digestion. Intestinal obstruction from impacted parasites has occurred.

Diagnosis.—This can only be positively determined by the discovery of the parasites in the stool, or by their being vomited, or crawling from the mouth.

Prognosis.—It is generally favorable, though should they penetrate the bile-ducts, fatal results would most likely follow.

Treatment.—The treatment will not only consist in removing the parasites, but also in improving the general health, so as to render the soil "*sterile*," for parasites will not inhabit a healthy intestinal canal.

Fortunately we have a specific in santonin, and as this remedy is the least disagreeable of the many anthelmintics, it is the one most universally given. To get the best results, the agent should be administered on an empty stomach, and so is given *before* each meal, the child being placed on a light diet for forty-eight hours, and not allowed to "*piece*" between meals. I usually give, of the first trituration, about as much as will lie on a dime, three times a day. In addition the child should have a dose of sulphur twice a week for several weeks.

Spigelia is another specific for the removal of the round worm. A not unpleasant and efficient vermifuge is the following:

℞ Fluid Extract of Spigelia.....ʒi to ii.
Powdered Santonin.....gr. xv.
Simple Syrup.....ʒiii.
Essence Peppermint.....gtt. x. M.
Sig. Teaspoonful before each meal.

The bottle should be well shaken before each dose is given, as the santonin will not dissolve in the above vehicle. A laxative should be given the third day of the treatment.

After the removal of the parasites, treatment should be continued to bring about a better condition of the digestive tract and to improving the general health. A bitter tonic, plenty of fresh air, a nutritious diet, and the restriction of overindulgence in candy and sweetmeats, will give the best results.

OXYURIS VERMICULARIS.

Synonyms.—*Ascaris Vermicularis*; Pin-Worm; Seat-Worm; Maw-Worm.

Natural History.—The *ascaris vermicularis*, or small thread-worm, has its habitat in the rectum, though it is sometimes found higher in the bowel, and occasionally in the vagina in the female.

The head is subulate, and divided into three vesicles, in the middle of which it receives nourishment; skin at the sides of the body finely crenate or wrinkled; tail finely tapering and terminating in a point; gregarious, viviparous, and about half an inch long.

Symptoms.—The *ascaris vermicularis* makes itself known by an intolerable itching and crawling sensation about the anus. At first it generally comes on after the little patient gets warm in bed, the irritation being so great that sleep is impossible; at last, they are more or less troublesome all the time. The irritation is occasionally so great as to impair the health, and occasionally gives rise to convulsions.

"The worm is occasionally found wandering outside to the sexual organs, which, from the itching caused, sometimes leads to masturbation in children.

They are readily detected in the feces. Infection probably takes place through the water, or possibly through salads, such as lettuce and cresses. A person, the subject of the worms, passes ova in large numbers in the feces, and the possibility of reinfection must be scrupulously guarded against.

Treatment.—Many remedies have been recommended for the *ascaris vermicularis*, but it is very questionable whether vermifuge medicines have any effect upon the parasite. Its local habitat being the rectum and lower portion of the colon, all that will be necessary for their removal is an injection of strong salt water. A strong decoction of quassia is also attended with good results.

Having thoroughly cleared the bowel of the irritating parasite, the tonicity of the bowel must be improved. *Nux vomica*, sul-

FIG. 56. OXYURIS VERMICULATUS.

Group of pin-worms, natural size.

Battle & Co.

phur, and such agents as will secure a normal peristaltic action of the intestine, should be administered.

TRICHOCEPHALUS DISPAR.

Synonyms.—Long Thread-Worm; Whip-Worm.

Natural History.—The *trichocephalus dispar*, or long thread-worm, is found in the intestines, both large and small, and in the stomach, and especially in sickly children and those who are poorly nourished.

"The body is obese, slightly crenate, beneath smooth, finely striated on the forepart; the head obtuse and furnished with a

slender retractile proboscis; tail or thinner part twice as long as the thicker, terminating in a fine, hairlike point; about two inches long, and its color light yellow." There may be several hundred of the parasites found before their complete extinction.

Symptoms.—The trichocephalus, although it may be found in large numbers, rarely produces any symptoms.

Diagnosis.—This is readily made by finding the presence of the worms or finding the characteristic lemon-shaped, hard, dark-brown eggs in the feces.

Treatment.—Vermifuges internally and irrigation of the bowels with saline solutions, will constitute the treatment. The after medication will be as directed for other intestinal parasites.

TRICHINIASIS.

Synonym.—Trichinosis.

Definition.—A disease of the muscles due to the presence of the trichina spiralis, which results from eating raw or partially cooked pork.

History.—Owen was the first to name and fully describe this parasite, in 1835, though it had been observed and described as "minute white masses" in 1821 by Hilton. To Zenker, however, belongs the honor of reporting the first clinical records, in 1860. The disease was at first diagnosed as typhoid fever, but a train of symptoms developed entirely different from that of enteric fever, the most prominent of which was an intense myalgia. After suffering for a month the patient died.

A post-mortem examination revealed the presence of sexually mature parasites in the intestines, embryos in the muscles in various stages, to those completely developed and encapsuled.

Natural History.—The adult female is from three to four mm. long; the male from 1.4 to 1.6 mm., with a short conical appendage on either side of the cloaca, behind which are two pairs of papillæ.

The fully developed larva, or muscle trichina, measures from 0.6 to 1 mm. in length and is coiled in a capsule. Translucent at first, it soon becomes opaque, owing to infiltration of lime salts.

Etiology.—Infection takes place by eating infected pork, and occurs in the following manner: The capsules of trachinæ are digested in the intestines and the parasites set free, which become sexually mature in from two to four days. Each female produces several hundred young, requiring from three to five days for their development, or from the ingestion of the infected pork to the full development of the embryos, a period of from seven to nine days.

The female worm, after penetrating the intestinal wall, discharges the embryos into the lymph spores, thence into the bloodstream, which carry them to the muscles. Here their further development is completed in about two weeks, when they reach the full grown muscle form.

As a result of their presence, an inflammation is set up, which results in the formation of a capsule in which one or more worms are entombed.

The capsule of connective tissue finally undergoes calcification. The parasite may retain its vitality within the capsule for years.

Swine are generally infected by eating, either intestinal discharges containing the infection or infected cadavers.

The trachina in pork can only be destroyed by thorough cooking, hence raw or rare pork should never be eaten.

Pathology.—The mucous membrane of the bowel becomes hyperemic and swollen; the solitary follicles, Peyer's patches, and the mesenteric glands undergo the same changes. The spleen is but little affected, though the liver, kidneys, and heart may undergo cloudy swelling or fatty degeneration.

The muscles are the parts most affected, and show the changes peculiar to myositis. The trichinous cysts are grayish-white, oat-shaped specks, arranged longitudinally in the muscle fibers. The muscles most affected are the diaphragm, the intercostal, the cervical, the laryngeal, and the ocular.* In the extremities, the biceps and triceps are especially the seat of election.

Symptoms.—The symptoms vary according to the number of parasites ingested. Where but few are present, there may be an entire absence of any symptoms to suggest the lesion.

In typical cases, gastro-intestinal disturbances follow shortly after eating the infected meat. It may begin with malaise and nausea, soon to be followed by vomiting and diarrhea. At times

it may simulate gastro-enteritis, the vomiting and purging being accompanied by quite an active fever.

In the course of a week or ten days, symptoms of rheumatism appear, more in the *muscles* than in the articulations. The muscles become swollen, tender, and painful when moved, especially in flexion. If fever was present during the gastro-intestinal symptoms, it is now increased, or chilly sensations, followed by an active fever, may usher in the muscular symptoms.

Mastication and deglutition become painful, while flexing the extremities is attended by pain. Dyspnea is due to involvement of the diaphragm. Edema of the face, particularly the eyelids, is quite a constant symptom. Pruritus is often a troublesome feature, accompanied by various skin eruptions and profuse sweating.

Bronchitis is not an infrequent complication, while hypostatic pneumonia, or pleurisy may occur. The urine is diminished in quantity, is high-colored, and may contain albumin and casts. In severe cases, insomnia is a troublesome condition.

Diagnosis.—The diagnosis is made by the following characteristic signs: Gastro-intestinal symptoms, consisting of dry tongue, nausea, vomiting, and diarrhea, followed, in a few days, by soreness of the muscles of the neck and extremities; difficult mastication and deglutition; edema of the eyelids and face; soreness and stiffness of the muscles at large; profuse sweating, attended by an urticarial eruption, and fever of a remittent type.

Prognosis.—In mild cases and in children, the prognosis is favorable. If large numbers of trichina are present in the meat, and they are not destroyed in the cooking, the case will most likely prove one of great severity, the mortality running from five to thirty per cent.

Persistent and profuse diarrhea, high fever, intense muscular soreness, difficult deglutition, profuse sweating, cardiac weakness, delirium, and coma, would suggest an unfavorable termination.

Treatment.—If it were possible to destroy all the rats that infest sties, and thus prevent swine from eating anything but grain and vegetables, and to drink only pure water, trichina would disappear, and prophylaxis will look toward the accomplishment of this end.

The most efficient means, however, is to thoroughly cook all pork, smoked, salted, or fresh, for this completely destroys the parasites.

The bowels should be evacuated as soon as possible after infected meat has been eaten, before the embryos have had an opportunity to penetrate the muscles. It is well to combine santonin, male fern, or thymol with whatever purgative that is used. Cathartics should be used for two or three days, that the bowel be thoroughly emptied of all the parasites.

For the soreness of the muscles, the hot bath will afford some relief. Macrotys in large doses might mitigate, to some extent, the myalgia. When the pain is extreme, morphia may be necessary. Should typhoid symptoms arise, baptisia, echinacea, the mineral acids, the sulphites, and chlorates would be used.

CESTODES.

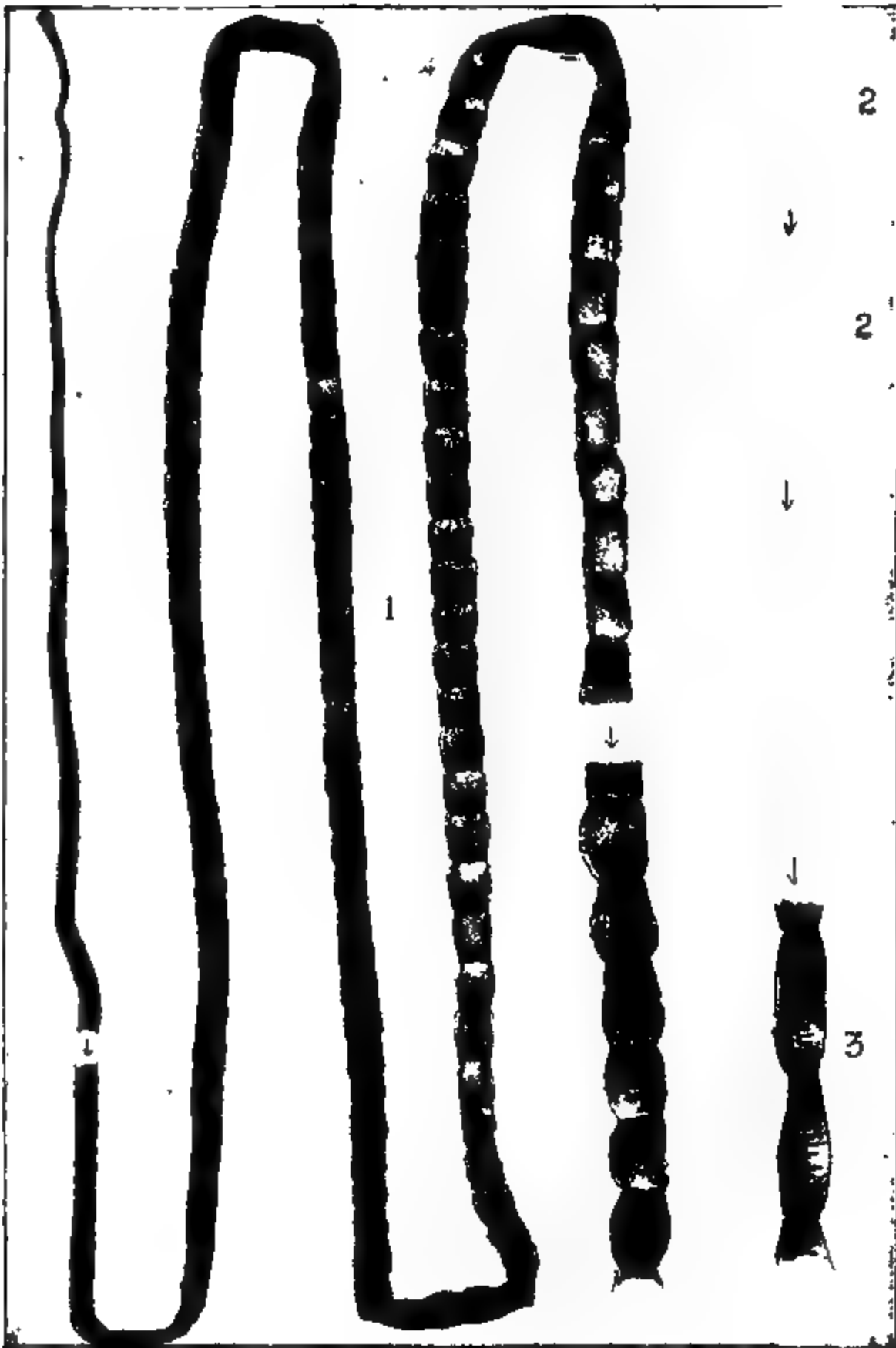
TÆNIÆ OR TAPE-WORMS.

Tænia Soleum (*Pork Tape-worm*).—This variety of flat worms is not so often seen in our country as in Europe. It is from six to fifteen feet long. Its habitat is the small intestine—the ileum—and though usually found alone, there may be two or more in the same bowel.

It is divided into three parts, a head, neck, and a number of segments. The head is round and smaller than a pin-head. It has four suction disks and a double row of hooks, about twenty-six, hence it is called the *armed* tape-worm. A small, slender neck, about an inch long, is attached to the head, and then follow the segments or joints, proglottides, progressively increasing in length and breadth.

The segments contain both male and female organs of generation. The uterus runs through the middle of each segment. Here the thick-shelled eggs develop, each containing an embryo with its hooklets.

The worm requires from three to four months for its development, and upon maturity sheds one or more segments, which, with their ova, pass with the feces into the world. For their further development, the ova must be taken into the stomach of the



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FIG. 57. TÆNIA SAGINATA.
(Unarmed Tapeworm)

1. Adult worm, natural size. Showing head and gradual increase in size and change in segments.
2. Odd, or irregularly developed segments occasionally met with. A trifle enlarged to show peculiarities.
3. Segments fully matured and detached.

hog, where the shell is dissolved and the embryo set free. These penetrate the walls of the stomach and intestines, enter the blood-current, and are carried to the muscles, where in two or three months they develop into cysts, from whose walls a newly developed *tænia* head—scolex—arises.

These cysts are known as *measles* or cysticerci. When taken into the stomach through eating *rare pork*, a new *tænia* develops in from three to four months.

Tænia Saginata or *Mediocanellata* (*Beef Tape-worm*.)—This is the variety commonly found in this country. It is longer than the pork tape-worm, being from fifteen to forty or more feet long. The head is larger than that of the *tænia* soleum, is square-shaped, has four large sucking disks, but has no hooklets, hence is known as the unarmed tape-worm. The segments are thicker, broader, and longer than those of the *tænia* soleum, and when segments are expelled exhibit a crawling motion in contradistinction from the *tænia* soleum, which are non-motile.

The life history of this worm is about the same as the pork-worm, with this difference, the cysticerci do not inhabit pork, but are found in beef; hence the infection in man comes from eating *rare* or *raw beef*.

Symptoms.—The symptoms of the presence of a tape-worm are not constant. One of the largest specimens I ever saw was not suspected till the patient noticed a number of segments passed in the stool, his health being unusually good. At other times there will be colicky pains and diarrhea, alternated with constipation. There may or may not be a voracious appetite.

After the patient discovers the passing of one or more segments, nervous symptoms are apt to develop, the patient becoming melancholy or hysterical. Chorea, convulsions, and even epilepsy, have occurred; but this may have been a coincident rather than a result.

Though in most cases the health is but little impaired, we must admit that they may occasion severe illness.

Diagnosis.—This can only be positively made by the presence of segments of the worm or the ova in the stool.

Prognosis.—This is always favorable, no matter how long the worm has been present in the intestine.

Treatment.—The prophylactic treatment will consist in eating only thoroughly cooked pork and beef, and drinking pure water. Care should be taken to destroy the stools containing segments of the worms, so that animals may not take them into their digestive tract to further propagate them.

There are a number of reliable anthelmintics, though some are so nauseating, that they are rarely used, especially since we have at least two that rarely ever fail to bring good results, and yet are free from disagreeable sensations. The most prominent anthelmintics are male fern, pomegranate bark, pumpkin-seed, kousso, turpentine, chloroform, and thymol.

Before administering the selected drug, the patient should undergo preparatory treatment for twenty-four or forty-eight hours, which consists of fasting, or restricting the diet to two or three glasses of milk, and thoroughly emptying the bowels with salts or antibilious physic.

The agent that has *never* yet failed me, and I have used it a great many times, is "granatum." It is not unpleasant, children taking it without the least trouble. It should be given in bed, early in the morning, on an empty stomach, and the patient instructed not to get out of bed for at least two hours; this precaution must be insisted upon, as the remedy often produces dizziness if the patient assumes the erect position too soon after the ingestion of the agent.

One hour and a half after the administration of the remedy, give a full dose of Epsom salts and await results. As soon as the bowels move, the parasite *will* appear.

Dr. Webster speaks equally positive of thymol. After a similar preparation of the patient, he administers thirty grains of the powdered drug, to be followed in two hours by a second dose if the first fails to bring about the desired results. No matter what agent is used, it should be followed by a cathartic about an hour after its administration.

PEDICULOSIS.

Synonyms.—Phthiriasis; Morbus Pediculosis; Lousiness.

Definition.—A local or general cutaneous irritation due to the presence of the louse, or pediculus, and is vulgarly known as *lousiness*.

There are three varieties of this parasite that are found in man, each selecting its own field of operation, and rarely invading any other territory, and that only by accident and is temporary. The *pediculus capitis*, or head louse, having for its field of operation, the region of the scalp. The *pediculus corporis*, or body louse, has a larger field of operation and is on the general body surface, while the *pediculus pubis* has for its habitat the pubic region, though it may be found on other parts where the hairs are short and stiff, as the axillæ, the eyebrows, the eyelashes, and the stiff hair of the breast.

Pediculus Capitis.—The head louse is much smaller than the body or clothes louse, and is about two mm. long and one mm. broad; head acutely triangular and provided with two hairy antennæ, each of five articulations, and two eyes, a narrow thorax, with three hairy legs, provided with tarsal hooklets, projecting from each side. The male is much smaller than the female, and is found in smaller numbers.

The ova, or nits, are minute, dirty-white, pear-shaped bodies, glued to the hair by chitinous substance. They hatch out in from six to eight days, and are sexually mature in from twelve to sixteen days. The female lays from fifty to sixty eggs in a week, or, according to Kaposi, a progeny of five thousand can be reared in eight weeks from a single female. According to Crocker, the color, while generally gray, varies according to the color of its host, being gray with blackish margins on Europeans, white on the Esquimaux, black on the Negro, and yellowish-brown on the Chinese.

Etiology.—While they may be found in all ages, they are most common among children, and those who neither wash or comb their hair frequently. They are conveyed from one to another by direct contact with an individual suffering with the parasites, or by using the same hat, brush, or comb.

Symptoms.—In healthy and well-nourished patients, the only marked symptom is the intolerable itching which causes the patient to scratch, not only at the seat of the parasite, but all over the scalp. They are more abundant in the occipital region where the hair is the thickest, and here may be found excoriations, which, in the poorly nourished and filthy, soon become pustular, producing impetigo contagiosa, or pustular eczema develops. If

means are not used to destroy the parasites, and the hair is neglected, this pustular eruption extends to all parts of the scalp.

Diagnosis.—The diagnosis can readily be made by a careful examination of the head and finding the parasite or nits; the latter need not be mistaken for seborrheic scaly particles, if we remember that the latter can be removed by light brushing or shaking, while the former are firmly glued to the shaft of hair, and can not be removed by brushing.

Treatment.—Where the hair is matted or the nits abundant, it is better to have the hair cut short, though not absolutely necessary. The hair and scalp is to be thoroughly saturated with petroleum (coal oil) and allowed to remain for ten or twelve hours, when the parasites and ova are entirely destroyed. This will be followed by thoroughly washing the head with warm water and soap; any good toilet soap may be used. Should there be impetigo or eczematous pustules, a bland wash or ointment should be used. The hair should be carefully combed with a fine-tooth comb, in order to remove the ova, shells, and parasites.

Pediculus Corporis.—The body louse resembles the anatomical peculiarities of the pediculus capitis, though much larger, and, like the latter, the female is of greater size. When not distended with blood, they are a light-grayish color. The female lays from seventy to eighty eggs, from which the young develop in from four to eight days, and are sexually mature in from twelve to fifteen days.

This parasite inhabits the clothes, the seams being their hiding-place, as well as their breeding-grounds, though sometimes the ova may be found on the lanugo hairs. It thrives better in impoverished subjects, alcoholics, tramps, and the unwashed class. It is found more frequently in adults than in children.

Symptoms.—The subjective symptoms are an intense itching, burning, and formication that is distressing. As a result the victim scratches, and parallel wheals or lines are quite characteristic. On examining the skin, in addition to the traumatism made by the nails, will be found the characteristic mark of the parasite. This is the minute hemorrhagic speck, the result of the bite. It is not sensible to the touch, and must be carefully sought as one of the diagnostic traits.

A favorite location for the parasites is the neck-band of the

shirt, and as they wander forth for a meal, the nucha and shoulders suffer most.

Diagnosis.—This will be made by the characteristic symptoms just named—evidence of scratching, hemorrhagic specks, and parallel wheals. A careful search of the seams of the clothes must be instituted for the parasite and ova.

Treatment.—Unless the ova are found upon the lanugo body-hairs, boiling, baking, or ironing the clothes with very hot irons, will destroy the parasites and their ova. A thorough bath with naphthol-sulphur soap, to be followed by the application of a weak carbolic wash, completes the cure.

Pediculus Pubis.—The “crab-louse,” or crab, is smaller than either the head or body louse. It is broader and flatter than the other varieties, the head is rounded, and provided with five pointed antennæ, and is attached squarely to the body. The abdominal and thoracic portions show no division. The ova, ten to twenty in number, hatch in six to eight days, and the young are sexually mature in two weeks.

Symptoms.—“Clinging to a couple of hairs, it digs deeply into the orifice of a hair follicle,” where it produces intense pruritus, attended by excoriations, papules, pustules, and other inflammatory symptoms. While commonly found in the pubic region, in very filthy persons it may also be found upon the eyebrows and eyelashes.

Diagnosis.—The diagnosis is made by the region involved in the itching, the presence of papules, and excoriations, and by finding the parasite and ova, which requires a very careful search, they being so much smaller than the other parasites.

Treatment.—While efficient, the old blue-ointment is unpleasant, and not infrequently is followed by dermatitis in persons of delicate skin. A wash of four grains of corrosive sublimate to an ounce of water, or an application of strong cologne is far more pleasant and equally efficient.

A favorite application of Shoemaker's is the following:

℞ Beta-naphtholʒi (4.0).
Cologne-waterʒiv.

WEIGHTS AND MEASURES.

TABLE OF APOTHECARIES' WEIGHTS.

One Grain (Granum).....	gr. = a grain.
One Scruple (Scrupulus).....	℥ = 20 grains.
One Drachm (Drachma).....	ʒ = 60 "
One Ounce Troy (Uncia).....	℥ = 8 drachms.
One Pound (Libra).....	lb. = 12 Troy ounces.

TABLE OF MEASURES OF CAPACITY OR FLUIDS.

One Minim (Minimum).....	M — a minim.
One Drop (Gutta).....	gtt = about ½ minim.
One Fluid Drachm (Fluidrachma)....	ʒ = 60 minims.
One Fluid Ounce (Fluiduncia).....	℥ = 8 fluid drachms.
One Pint (Octarius).....	℥ = 16 fluid ounces.
One Gallon (Congius).....	C = 8 pints.

METRIC SYSTEM.

WEIGHTS.

One Myriagramme.....	Equals 10,000 Grammes.
One Kilogramme.....	" 1,000 "
One Hectogramme.....	" 100 "
One Decagramme.....	" 10 "
One Gramme (the unit of weight) equals the weight of one cubic centimeter of water at 4° C.	
One Decigramme	Equals 0.1 Gramme.
One Centigramme.....	" 0.01 "
One Milligramme	" 0.001 "

MEASURES OF CAPACITY OR LIQUIDS.

One Myrialiter	Equals 10,000 Liters.
One Kiloliter.....	" 1,000 "
One Hectoliter	" 100 "
One Decaliter.....	" 10 "
One Liter (the unit of measure) equals the volume of one cubic decimeter.	
One Deciliter.....	Equals 0.1 Liter.
One Centiliter.....	" 0.01 "
One Milliliter	" 0.001 "

METRIC SYSTEM WITH EQUIVALENTS.

METRIC WEIGHTS.		EQUIVALENT.	
One Myriagramme	Equals	22,046 lbs.	Avoirdupois.
One Kilogramme.....	"	15,432.35	Grains Troy.
One Hectogramme	"	1,543.235	" "
One Decigramme.....	"	154.323	" "
One Gramme	"	15.432	" "
One Decigramme.....	"	1.543	" "
One Centigramme.....	"	0.154	" "
One Milligramme	"	0.015	" "

METRIC MEASURES.		EQUIVALENT.	
One Myrialiter.....	Equals	2641.7	Gallons.
One Kiloliter	"	264.17	"
One Hectoliter.....	"	26.417	"
One Decoliter.....	"	2.6417	"
One Liter equals 2.113	Pints.	0.264	"
One Deciliter	"	3.381	Fluid Ounces.
One Centiliter.....	"	2.704	Fluid Drachms.
One Milliliter.....	"	16.231	Minims.

APOTHECARIES' WEIGHTS AND MEASURES, WITH METRIC EQUIVALENTS.

WEIGHTS.		EXACT METRIC EQUIVALENTS.	
1 Ounce Avoirdupois (437.5 gr.)	Equals	28.350	Grammes.
1 Ounce Troy (480 gr.)	"	31.103	"
1 Drachm Troy (60 gr.)	"	3.888	"
1 Scruple (20 gr.)	"	1.296	"
1 Grain.....	"	0.06479	"
1-10 Grain.....	"	0.006479	"
1-60 "	"	0.001079	"
1-100 "	"	0.000648	"
1-200 "	"	0.000324	"
1-500 "	"	0.000129	"

MEASURES. EXACT METRIC EQUIVALENTS. APPROXIMATE EQUIVALENTS.

1 Gallon	equals 3.7854	Liters	Equals 4	Liters.
1 Quart	" .34636	"	" 1	"
1 Pint	" 473.180 cu. cent.	"	" 1/2	"
8 Fluid Ounces	" 235.590	"	" 1/4	" or 240 c. c.

4	"	"	"	118.295	"	"	"	1/8	"	or 120 c. c.
1	"	"	"	29.574	"	"	"			30 cubic Centimeters.
1	"	Drachm	"	3.697	"	"				
1	Minim		"	0.061	"	"				

Since one cubic centimeter of water weighs one gramme, the word "gramme" is often used instead of cubic centimeter for liquid measure.

IMPORTANT INCOMPATIBLES.

Acacia (gum), with alcohol, iron, lead-water, and mineral acids.

Acids (mineral), with alkalies and relatively weak salts of other acids, such as bromides, chlorides, and iodides.

Alkalies, with acids and with relatively weak salts.

Antipyrin and antifebrin should be given with alcohol or water only.

Arsenic, with tannic acid, salts of iron, and lime and magnesia.

Bitter infusions and tinctures, with salts of iron and lead.

Bromides, with acids, acid salts, or alkalies.

Calomel, with antipyrin, alkalies, lime-water, salts of iron and lead, and iodide of potassium.

Camphor (spirit of), with water.

Carbonates, with acids and acid salts.

Chloral, with cyanides.

Chlorides, with silver salts, lead salts, and alkalies.

Chloroform (except in minute quantity), with water.

Corrosive sublimate, with alkalies, lime-water, salts of iron and lead, iodide of potassium, albumin, gelatine, and vegetable astringents. (It may, however, be advantageously combined with tincture of the chloride of iron and liq. acidi arsenosi, or with iodide of potassium).

Digitalis, with iron and preparations containing tannic acid.

Iron (salts), with anything containing tannic acid. Tincture of the chloride of iron, with alkalies, carbonates, mucilages, and preparations containing tannic acid.

Mucilages, with acids, iron salts, and alcohol.

Potassium chlorate (and potassium permanganate) should not be rubbed up with tannic acid or other organic oxidizable substance.

Potassium (iodide of), with all strong acids and acid salts. (See corrosive sublimate.)

Spirit of nitrous ether with antipyrin, sulphate of iron, tincture of guaiacum, and most carbonates.

Vegetable preparations holding tannic acid, with salts of iron and lead.

Alkaloids are precipitated or destroyed by tannic acid, alkalies, iodine or iodides, and chlorinous compounds.

POISONS AND ANTIDOTES.

The following table contains suggestions for the proper treatment of those forms of poisoning most likely to occur. Though brief, they are all that will be needed to prompt the physician's memory:

Nature unknown: Provoke repeated vomiting; give bland liquids; stimulate, if necessary; keep up breathing.

Acids—Sulphuric, Nitric, Hydrochloric, Oxalic: Give an alkali (soap, soda, and whitewash usually at hand); lime-water; magnesia; provoke vomiting; avoid stomach-pump; give ice cream and bland fluids; secure rest; relieve pain by opium; stimulate, if necessary; feed by enema.

Hydrocyanic Acid and Potassium Cyanide: Stomach-pump or emetic; stimulate; potassium permanganate; give dilute ammonia—water—by intravenous injection, if necessary; chlorine—water; cold affusions; give atropin, gr. $\frac{1}{4}$, hypodermatically.

Carbolic Acid and Creosote: Give Epsom Salts, dilute sulphuric acid; atropine, hypodermatically; stomach-pump or emetics; white of egg; amyl nitrite; stimulate; artificial heat.

Alkalies—Ammonia, Soda, Potash, Lye: Give vinegar, lemon-juice, or orange-juice, or other acid or fixed oil; give bland liquids; secure rest; relieve pain by opium; stimulate, if necessary.

Arsenic—Parisgreen, Scheele's Green, Fowler's Solution: Stomach-pump or emetics; give hydrated oxide of iron or dialyzed iron and magnesia; give dose of castor oil; secure rest; stimulate, if necessary.

Acetate of Lead: Stomach-pump or emetics; give Epsom salts or dilute sulphuric acid; milk, raw eggs, and water; morphine hypodermically for pain; Potassium iodide to eliminate the drug.

Mercury, Corrosive Sublimate, Antimony, Tartar Emetic: Emetics; careful lavage; give some infusion containing tannic acid; give raw eggs and milk; bland liquids; give dose of castor oil; stimulate, if necessary.

Copper Salts: Give albumin (milk, raw eggs); yellow prussiate of potassium; stomach-pump or emetics; give bland fluids.

Phosphorus: Provoke vomiting by repeated five-grain doses of sulphate of copper; Potassium permanganate ($\frac{1}{4}$ per cent); give dose of magnesia, but *no* oil.

Nitrate of Silver (lunar caustic): Give strong salt and water; provoke vomiting; repeat both many times.

Iodine: Stomach-pump or emetics; give starch and water; give bland fluids.

Opium—Morphine, Laudanum, Paregoric, etc.: Stomach-pump; emetic; Potassium permanganate, by mouth; adrenalin; ammonia; hot strong coffee by the bowel; atropine, cocaine, or strychnine hypodermatically; oxygen inhalations; artificial respiration; lingual traction.

Chloral—Paraldehyde: Stomach-pump or emetic; artificial heat; massage; stimulate; strychnine; amyl nitrite; artificial respiration.

Nux Vomica—Strychnine, Picrotoxin: Stomach-pump or emetic; animal charcoal or tannic acid; bromide and chloral; amyl nitrite, chloroform by inhalation; artificial respiration.

Aconite—Veratrum Viride: Stomach-pump or emetic; stimulate, heat; atropine; artificial respiration.

Hemlock, Toadstool, Tobacco, etc.: Provoke vomiting and give a purge; tannic or gallic acid: stimulate well; keep up breathing.

Belladonna or Atropine, Hyoscyamus or Hyoscyamine, Duboisia or Duboisine, Stramonium or Daturine: Stomach-pump

or emetic; stimulate; Enema hot strong coffee; artificial heat; morphine; pilocarpine; physostigmine, artificial respiration.

Alcohol: Stomach-pump or emetic; give ammonia and water.

Decayed Meat or Vegetables: Provoke vomiting; wash out stomach; give a purgative; give an enema; give powdered charcoal and hydrogen dioxide.

Poisonous Gases—Carbonic Acid or Oxide, Suphuretted Hydrogen: Fresh air; oxygen; artificial respiration; amyl nitrite or nitro-glycerin; stimulation.

To provoke vomiting, warm water may be used, with or without ground mustard (3ss to a pint of water), or ipecac (3i of the powder or f 3ss of the syrup), or a finger may be thrust down the throat. It is best to give large quantities (a pint at a time) of warm water whenever vomiting is to be excited. The stomach-pump or simple syphon-tube, if accessible, is better. Apomorphine (gr. 1/4-gr. 1) subcutaneously is a reliable emetic.

Bland liquids are milk, raw eggs, some sort of oil, mucilage, barley-water, gruel, etc.

Stimulants are tea, coffee, whiskey, wine, etc., or ammonia and water. Of this last a teaspoonful in a teacupful of water will be enough for a dose. In making tea or coffee one must not wait to do it as if for the table, but mix hot water and the leaves or grounds, squeeze them well, stir together, and give the whole—leaves, grounds, everything.

Alkaline antidotes which are most likely to be at hand are ammonia and water (a tablespoonful in two teacupfuls of water), soap and water, lime, whiting, soda, chalk, tooth-powder, plaster, magnesia, whitewash, and even wood-ashes.

Acid antidotes most commonly accessible are vinegar and lemon-juice.

In giving an antidote it is well to remember that it is not always necessary to wait for it to dissolve, but that it may be stirred up in any fluid at hand (except oil), and swallowed immediately.

Antagonists are drugs which physiologically oppose the poison, as atropine to opium, chloral to strychnine, pilocarpine to atropine.

INDICATIONS FOR REMEDIES.

Achillea. In irritative conditions of the urinary apparatus, strangury and suppression of urine. The best results are obtained from the infusion. Of the specific tincture, use in from five to ten drop doses.

Acids. A deep red tongue.

Acidum Benzoicum. Very strong smelling urine.

Acidum Carbolicum. As a topical antiseptic, one part to five or twenty of glycerine or linseed or olive oil.

Acidum Hydrocyanicum. An elongated and pointed tongue, reddened tip and edges; uneasy sensations in stomach, with painful retchings—gtt. v of the commercial acid to water ℥iv, in small and frequently repeated doses.

Acidum Muriaticum. A deep-red tongue, brown coat and sordes.

Acidum Nitricum. Violet color of tongue; in many cases it seems like a transparent color over red—gtt. xx to water ℥iv.

Acidum Sulphurosum. Tongue of natural color, full, dirty; tissues of throat look full and lifeless. The skin has a rusty, lifeless appearance.

Aconite. In fevers and inflammatory conditions with a small, frequent pulse, and increased temperature—and especially in quinsy, croup, irritant diarrhea and dysentery—gtt. v to x to water ℥iv.

Adonis. In mitral insufficiency, palpitation, irregular action of the heart, dropsy, and dyspnea, this agent will prove a good tonic, gtt. x to xx to water ℥iv.

Æsculus. A stimulant to the nervous system, and useful in difficult breathing of asthma when not of a paroxysmal character, also a good remedy in hemorrhoids—gtt. x to xxx to water ℥iv.

Agrimony. Atonic conditions of the urinary apparatus, and where the urine is thick and gelatinous. Improves the tone of all mucous membranes—℥j to ℥ij to water ℥iv.

Alcoholic Stimuli. When there is prostration, the pulse being soft and feeble—small quantities frequently repeated.

Aletris Farinosa. Too frequent menstruation, with labor-like pain and sense of debility in pelvis; complains of pelvic articulation, or inability to support the body on the feet—gtt. x to \mathfrak{z} j in water \mathfrak{z} iv.

Alkalies. A broad, pallid tongue.

Aloes. The patient evacuates the lower bowel with difficulty—gtt. x to water \mathfrak{z} iv.

Alumina (aluminium oxide). Can not pass the urine without great straining, as at stool—a trituration, 1-100 to 1-10, dose one grain.

Ammonii Bromidum. Convulsive action of the muscles; convulsions when there is a return to consciousness; epileptiform disease— \mathfrak{z} ij to \mathfrak{z} j in water \mathfrak{z} iv.

Ammonii Muriaticum. Deep or dull redness of the surface, effaced by pressure slowly returns— \mathfrak{z} j to water \mathfrak{z} iv, and as a bath.

Ammonii Iodidum. Dull pain in head with dizziness, and inability to command the voluntary muscles— \mathfrak{z} ss, water \mathfrak{z} iv; a teaspoonful three times a day.

Amygdalis Persica. An elongated and pointed tongue, reddened tip and edges, gastric tenderness—an infusion, or of the tincture gtt. xx to \mathfrak{z} ij in water \mathfrak{z} iv.

Antimonium Tartaricum. Stridulous breathing, with difficult respiration, seemingly from want of muscular power— \mathfrak{z} d to 6th decimal trituration in doses of one-fourth grain.

Apis (tincture of the honey bee). Itching with burning of the surface, especially of the genitalia or urinary passages—gtt. x to water \mathfrak{z} iv.

Apocynum Cannabinum. Fullness of eyelids, swelling of the feet, œdema of any portion of the superficial cellular tissue, dropsy—gtt. v to gtt. xx in water \mathfrak{z} iv.

Aralia Hispida. Dropsy of cavities—an infusion, or the tincture, \mathfrak{z} ss to water \mathfrak{z} iv.

Argentum Nitricum. Intense tormina and tenesmus, with discharge of pinkish mucus, streaked with bright blood—one-third to one-fourth grain in form of pill.

Arnica. Tensive pain in the back as if bruised or strained; muscular pain and soreness when the limbs are moved; feeble respiration—gtt. x to water \mathfrak{z} iv.

Arsenicum (Fowler's solution). Skin has lost its elasticity, epidermis dry; tendency to the formation of vesicles; tongue contracted and pointed; pulse soft and easily compressed—gtt. j to gtt. x in water ℥iv. (Donovan's solution) We employ this preparation in the treatment of secondary syphilis, if the tongue is small and its redness increased.

Arum Triphyllum. Intensely sore throat, bleeding, with marked fetor; sense of fullness and swelling of the throat and tongue—gtt. x to water ℥iv.

Asclepias Tuberosa. Pulse strong, vibratile; skin moist, pain acute and seemingly dependent on motion—gtt. x to ℥j in water ℥iv.

Aurum Muraticum Natronatum (chloride of gold and sodium). Indolent chancres and buboes, not sensitive; secondary and tertiary symptoms; in all cases the tongue is contracted and redder than usual—gr. 1-60 to 1-12, in pill or lozenge. In its action the properties of gold differ but little from those of mercury.

Avena. Sleeplessness with irritability, nervous prostration due to mental strain, headache, melancholia, and hysteria. A nerve tonic, stimulant, and anti-spasmodic—℥j to ℥ij to water ℥iv.

Baptisia. Face full, dusky, purplish-red, like one who has been in the cold for a long time; tongue has the same dusky, purplish color; headache dull, pulse oppressed—gtt. v to x to water ℥iv.

Barosma. A highly acid urine, with a constant desire to urinate without any apparent relief from micturition—℥ij to ℥iv to water ℥iv.

Baryta Carbonica. Weight and pressure about the pubes; scanty menstruation; very sensitive to cold. (2d to 6th trituration in doses of gr. 1-4 to gr. j.)

Belladonna. Dullness, hebetude, disposition to sleep, coma, eyes dull, pupils dilated—gtt. v to gtt. x in water ℥iv.

Berberina Sulphas. Profuse menorrhagia, with an active circulation—gr. j to grs. ij.

Bismuth (liquor). Tongue red, papillæ prominent; uneasy sensations in stomach towards the close of digestion, extending downwards and terminating in diarrhea—gastro-intestinal irritation—gtt. xx to ℥j.

Boletus Laricis. Chills confined to the back; chills alternated

with flushes of heat; great weight and debility of the back—gtt. x to water ℥iv.

Bromine. As an inhalation in croup—gtt. x to water ℥j, heated.

Bryonia. Pain of a tensive cutting character, of serous membranes; headache extending from forehead to occiput, right side; right cheek flushed; cough hacking, as from some irritating substance; rheumatic pain has the same tensive, cutting character.

Cactus Grandiflorus. Irregular movements of the heart; irregular pulse, usually increased in frequency; unpleasant sensations in præcordia and fear of impending danger. The action of the heart is always impaired, never increased—gtt. x to ℥j in water ℥iv.

Calcareæ Carbonica. Enlargement of lymphatic glands; pallid inelastic skin; softness of tissues; diseases of the reproductive apparatus of women, with these symptoms—Homeopathic triturations.

Calcium Hypophosphite. Is especially indicated when there is a deposit of aplastic or cacoplastic material in connective tissue, slight inflammatory symptoms resulting; tuberculosis; phthisis pulmonalis—grs. ij to grs. v three times a day.

Calendula. In enfeebled conditions of the capillary blood vessels. An excellent application to ulcers and wounds—℥j to water ℥iv.

Calx (lime). A remedy for boils, and inflammations of cellular tissue having something of this character. In infantile dyspepsia, when the discharges from the bowels are green, and the child throws up curdled milk—lime water.

Calx Chlorinata. The tongue is pallid, breath fetid; inflammation of cellular tissue, with tendency to sloughing—℥j to water Oj, filtered; dose gtt. x to ℥ss, largely diluted.

Camphor. Insomnia and restlessness, the pulse being soft, tongue moist; diarrhea—gr. i-8 to gr. j.

Cannabis Indica. Painful micturition with tenesmus; insomnia with unpleasant dreams during momentary sleep—gtt. x to xx in water ℥iv.

Capsicum. In full doses (℥ss to ℥j) in delirium tremens, with feeble pulse, cold extremities, and pallid face.

Carbo-Veg. Pallid skin, feeble circulation, with hemorrhage; pale tongue, with slight coat, lifting in patches; tumid, doughy

- abdomen. It is the remedy for asthenic hemorrhage—2d dec. trituration, dose gr. j.
- Caulophyllum*. Uterine pains and tenderness in persons of full but lax habit; rheumatic pains in asthenic plethora. In labor with deficient pains when the tissues give a sensation of fullness as from congestion—gtt. xx to water ℥iv.
- Ceanothus*. Enlarged spleen, sallow skin, and expressionless face. Profuse secretion of mucus with absence of inflammation—gtt. xx to ℥ij to water ℥iv.
- Chamomilla*. Green watery diarrhea; head sweats; very sensitive—gtt. x to water ℥iv.
- Chimaphila*. In chronic diseases of genito-urinary mucous membranes, with scanty urine, muco-purulent sediment, vesical tenesmus, frequent micturition, and smarting pains—℥j ℥iij to water ℥iv.
- Chionanthus*. Pain in epigastrium and right hypochondrium, simulating colic, sometimes extending to abdomen; intense pain in region of the liver, extending to umbilicus, with great prostration and sometimes nausea; jaundice—gtt. ij to gtt. x as a dose.
- Chelidonium*. Scybalous fæces; pain in right shoulder and in dorsal spine; greenish-yellow tinge of skin.
- Chloral*. May be used to produce sleep, if the pulse is soft, circulation and temperature equal, temperature not above 100°. In small dose (one grain) it may be used in irritable dyspepsia, associated with hydrastis—dose, grs. v to grs. xx.
- Chloroform*. In doses of gtt. j to gtt. x it may be given in severe and protracted chills; in the same dose it is regarded as a solvent for biliary calculi. Used as an anesthetic. Notice that respiration is regular and free.
- Cimicifuga*. See *Macrotys*.
- Cinchona or Cinchonidia Sulphas*. Has nearly the same value as sulphate of quinia, but not so apt to produce head symptoms. May be used as an antiperiodic if the pulse is soft, skin soft, tongue moist, and nervous system free from irritation. (The antiperiodic quantity for an adult is grs. x to grs. xv.)
- Cinnamon* (a tincture of the oil). This is the most certain remedy I know in post-partum hemorrhage—gtt. xx to ℥j, repeated as often as necessary.
- Citrus Limonum*. Lemon juice is a remedy for rheumatic pain,

when the tongue and mucous membranes are very red, the urine being alkaline.

Coca. Easily tired; feeling of weariness; difficult and labored respiration; temperature not increased—gtt. j to gtt. xx.

Collinsonia. A sensation as if some foreign body was lodged in the rectum, with contraction of the sphincter; contracted and painful perineum—gtt. x to water ℥iv . In chronic laryngeal irritation or inflammation, with sense of tickling in larynx, and cough arising from use of the voice— ℥j to syrup ℥iij .

Colocynth. Cutting pain in the abdomen, with diarrhea and dysentery, tenesmus increasing the pain—gtt. v to gtt. x in water ℥iv .

Conium. In rheumatic or neuralgic pain of feeble old persons; or in local disease with cacoplastic deposit—gtt. x to ℥j in water ℥iv .

Convallaria. Painful cardiac affections, with difficult breathing, excited heart's action, palpitation and dropsy—gtt. xx to ℥j to water ℥iv .

Cornus. General exhaustion, relaxed tissues, indigestion with stupor, acid eructations with headache and in malarial fevers with sodden tissues— ℥j to ℥ij to water ℥iv .

Corydalis. Catarrhal gastritis with coated tongue, foul breath, loss of appetite, and in chronic ulcerative conditions, and in secondary syphilis— ℥j to ℥ij to water ℥iv .

Cratægus. Cardiac disturbances, either functional or structural, especially the latter, are benefited by this agent. Cardiac neuralgia, palpitation, vertigo, irregular pulse, etc.— ℥ss to ℥j to water ℥iv .

Cubeba. A remedy in the second stage of gonorrhea, when the acute irritation has passed by; in enfeebled conditions of the large intestine and rectum—grs. ij to grs. x.

Cuprum. A blood maker after severe hemorrhage or exhaustive discharges, the skin being pale and transparent. In chlorosis and other diseases, when the skin has a dirty greenish tinge. The tongue is usually clean and the breath sweet—gtt. v to gtt. x in water ℥iv .

Cypripedium. In nervousness and sleeplessness from atony—gtt. ij to gtt. xx.

Digitalis. The stroke of the pulse is feeble; the current of blood is easily stopped by pressure; the sounds of the heart faint—gtt. x to water ℥iv .

- Dioscorea*. Abdominal pain of the nature of colic, with tenderness on pressure—gtt. x to 3j, water 3iv.
- Drosera*. The cough is expulsive as from irritation that can not be controlled; the cough of measles; whooping-cough—gtt. x to 3j in water 3iv.
- Echinacea*. A powerful antiseptic, locally and internally, in the bite of the rattlesnake, diphtheria, typhoid conditions, blood poisoning, and an alterative of great value in strumous diathesis, syphilis, old sores and wounds. gtt. v to 3j.
- Elaterium*. (Elaterium 3ss, alcohol Oj.) It has a specific influence upon chronic inflammation of the bladder. Passages of mucus or muco-pus with tenesmus; deep soreness in the bladder with dragging in the perineum—3ss to 3j at first to catharsis, then in doses of gtt. j to gtt. v.
- Epigæa*. A tonic or astringent diuretic, specifically adapted to chronic affections of the urinary apparatus, attended by irritation, an increased secretion of mucus, or a purulent discharge—gtt. xxx to 3j to water 3iv.
- Epilobium*. Diarrhea with colicky pains; feculent discharges with tenesmus; diarrhea with contracted abdomen; chronic diarrhea with harsh, dirty, constricted skin—an infusion, or of the tincture gtt. x to gtt. xx.
- Liquisetum*. A mild diuretic, invaluable in gravel and irritation of the urinary organs, with dysuria and pain after urinating; also in suppression of urine and dropsical affections—3ss to 3j to water 3iv.
- Ergot*. As a stimulant to the capillary circulation, and to the nerve centers—gtt. v to 3j to water 3iv.
- Erigeron* (Oil of). A remedy in active hemorrhage, with strong and not very frequent pulse—gtt. j to gtt. v.
- Eriodyction Glutinosa* (Yerba Santa). Cough with abundant and easy expectoration—gtt. v to xx with syrup.
- Eryngium*. Uneasiness in the bladder, frequent desire to urinate and painful micturition; pain in the bladder extending to the loins—gtt. x to 3j in water 3iv.
- Ether Sulphuric*. Headache, with pallid, expressionless face, feeble pulse, and cool extremities—gtt. v to x on a lump of sugar.
- Eucalyptus*. Sensations of coldness and weight in bowels; cold extremities; cold perspiration; perspiration during chill—in small dose, gtt. x to water 3iv; or in ague the larger dose of gtt. x to 3j.

Eupatorium (Perfoliatum). Full pulse, full skin, tendency to perspiration even during fever; deep-seated pains in muscles and bones—gtt. v to gtt. xx in water ʒiv .

Eupatorium (Purpureum). Urine scanty, milky; weight in loins; skin hot, dry, and constricted—gtt. x to ʒj in water ʒiv .

Euphorbia (Hypericifolia). Diarrhea, the discharges being greenish and irritant; frequent desire to go to stool, which relieves sometimes without any motion—gtt. x to water ʒiv .

Euphorbia (Corollata). The elongated and pointed tongue, prominent papillæ; uneasy sensations in the stomach and bowels as of a desire to go to stool—gtt. x to water ʒiv .

Ferrum (tinc. of the acetate). Pallid transparent skin; blueness of veins; dull, heavy pain in back of head—gtt. j to gtt. v in a wine glass of water three times a day.

Ferrum (tincture of the chloride). Erysipelatous disease, the part affected being deep red; tongue deep red; mucous membranes and throat somewhat full, and showing some redness—gtt. v to gtt. xx at a dose.

Ferrum (syrup of the iodide). Enlargement of the lymphatic glands, without deposit in connective tissue; pallid though full tissues; difficulty in retaining urine; sometimes stillicidium—gtt. v to ʒss .

Gadus Morrhua (cod oil). Deposit of cacoplastic or aplastic material in cellular tissue, with tendency to breaking down, with subacute inflammatory action.

Galium. Nodulated growth or deposits in skin or mucous membranes—gtt. x to water ʒiv .

Gallic Acid. Hemorrhage, with feeble pulse, cold extremities, and inelastic skin—dose, grs. v.

Gaultheria. Irritation of the base of bladder and prostate, leading to sexual excitement; increased sexual excitement, evidently from wrong of the reproductive organs, and not the mind—gtt. v to x.

Gelsemium. Flushed face, bright eyes, contracted pupils, increased heat of head, restlessness and indisposition to sleep, pain in the entire head; urine is passed with difficulty and in small quantity, with sense of irritation in the urinary organs.

Gentiana. Sense of depression referred to epigastric region, and associated with sense of physical and mental weariness—gtt. j to gtt. v.

- Geranium*. Diarrhea with constant desire to go to stool; chronic diarrhea with mucous discharges—gtt. j to gtt. x.
- Ginseng*. Nervous dyspepsia; sensation of dullness in head, with inability to control the voluntary muscles—gtt. x to 3j in water 3j.
- Gossypium*. In large doses will bring on and stimulate uterine contraction. As an emmenagogue when there is backache, with sense of dragging in the pelvis; sense of fullness and weight in the bladder, with difficult micturition—gtt. x to 3j in water 3iv.
- Graphites* (1st homeopathic dilution). Tardy menstruation, with disturbance of the nervous system; skin pale, or pale with dirty tinge; slow, difficult respiration, almost stopping during sleep.
- Grindelia*. Asthma; labored respiration with dusky flushing of face (person plethoric); old atonic ulcers; tissues full—3j to syrup 3ij; as a local application, 3j to water Oj.
- Grindelia Squarrosa*. Pain in the hepatic and splenic regions, especially effective in enlarged spleen; puffiness of the tissues, and pallidity of skin and mucous membranes—3j to 3ij to water 3iv.
- Guaiacum*. Acute tonsillitis, and in amenorrhea and dysmenorrhea when due to atony of the pelvic viscera—gtt. xx to 3j to water 3iv.
- Guarana*. Headache, with pallid face, feeble pulse, increased by exertion—gtt. x to 3ss as a dose.
- Hamamelis*. Fullness and relaxation of tissue; fullness of veins, inclined to dilatation; laxness of muscular fiber; increased secretion of mucus; sensations of fullness, weight and dragging—distilled extract: dose, gtt. j to gtt. xxx; and as a local application, one part to three or four of water.
- Hedeoma* (Pennyroyal). To restore the lochial discharge—use as an infusion.
- Helleborus* (Niger). Dullness of intellect, heaviness of head, coldness of forehead, with clammy sweat; jelly-like mucous discharge from the bowels—gtt. j to gtt. v in water 3iv.
- Helonias*. Mental depression and irritability associated with chronic disease of the reproductive organs of women—gtt. v to 3ss in water 3iv.
- Hydrangea*. To relieve irritation, and improve the nutrition of the urinary mucous membranes. Influences the respiratory

and digestive mucous surfaces in less degree—gtt. xxx to ʒj to water ʒiv.

Hydrastis. Irritation with enfeebled circulation, whether used as an internal remedy or as a local application. It is not a remedy for acute inflammation with arrest of secretion. It is especially applicable in diseases of mucous membranes, should not be used when connective tissue is principally involved—sulphate or phosphate of Hydrastia, gr. j to water ʒiv.

Hyoscyamus. "Delirium with hallucinations"—gtt. v to gtt. x, water ʒiv.

Hypophosphites (Compound syrup). When there is an enfeebled circulation, and feeble nutrition of nerve-centers. The surface is usually pallid, waxen, and the extremities inclined to be cold.

Hypericum Perforatum. It is claimed that it exerts a marked influence in relieving irritation in injuries of the spine, and in punctured or lacerated wounds of the extremities, preventing tetanus. Relieves the excruciating pain of such injuries—gtt. v, water ʒiv.

Iberis Amara. Cardiac hypertrophy; dropsy from cardiac disease; asthma associated with cardiac disease; pulse "purring," full and tremulous.

Ignatia. Morning chills; feels better out of doors; deap-seated and dull pain in epigastrium, feeling as if the stomach was dragged backwards; weak, empty feeling in stomach; pain shooting from right hypochondrium to shoulder—gtt. v to water ʒiv.

Ipecacuanha. Irritation of mucous membranes, with increased secretion—diarrhea, dysentery; inflammation of parenchyma of lung—gtt. v to xv, in water ʒiv.

Iris. Fullness of throat, enlargement of thyroid gland, fullness of throat with pulsation of arteries—gtt. x, water ʒiv, and as a local application.

Jaborandi. Powerfully increases the secretory action of the sudoriparous and salivary glands. Is useful where there is a high temperature and a dry skin—gtt. xx to ʒj to water ʒiv.

Juglans Cinerca. In large doses it is an excellent laxative; in small doses it relieves irritation of the stomach and intestines, and promotes digestion. It may be thought of as a remedy in chronic eczema—gtt. v to water ʒiv.

- Kalmia*. In syphilis with excited circulation—gtt. v to x, water ℥iv.
- Lactic Acid*. Deep redness of the tongue, deep redness of skin, pulse oppressed. (Whey is a most excellent form.)
- Lavandula* (Compound spirit). The child's stimulant; combined with lobelia in asthenic bronchitis, and in atony of bowels with pain.
- Leptandra*. Dull heavy pain in right hypochondrium, fullness of abdomen; tongue coated markedly white, but not a fur; is thirsty but can not drink water; restless and can not sleep—leptandrin gr. 1-2 to gr. j; tincture, gtt. x, water ℥iv.
- Lithium* (Benzoate of). Uneasiness in the loins, extending to the bladder; passage of mucus with phosphates from bladder; fullness and tension in perineum, and desire to micturate frequently, with difficulty in passing urine—gr. j in a glass of water three times daily.
- Lobelia*. Sense of fullness and oppression in præcordial region; oppression of chest and difficult respiration; sharp lancinating pain starting in heart and radiating to left shoulder and arm; mucus rattling in throat; full, oppressed pulse, weak pulse—stimulant doses, gtt. x, gtt. xx at a single dose in angina pectoris; gtt. x to water ℥iv in ordinary disease; combined with lavender for asthenic bronchitis of the child.
- Lycopus*. Chronic cough with frequent pulse and high range of temperature; hemorrhage with frequent pulse; albuminuria with frequent pulse; Bright's disease—gtt. x to gtt. xx, water ℥iv.
- Macrotys*. Muscular pains; uterine pain with tenderness; false pains, irregular pains; rheumatism of the uterus; dysmenorrhea. An anti-rheumatic when the pulse is open, the pain paroxysmal, the skin not dry and constricted—gtt. x to 3j, water ℥iv.
- Mangifera*. Tonic astringent to enfeebled mucous tissues with profuse discharges. In catarrh; leucorrhea; gleet; diarrhea; dysentery; and all passive hemorrhages—5ss to 3j to water ℥iv.
- Ménispermum*. Skin brown, tongue coated at base, tip red, irregular appetite, constipation—3j to water ℥iv.
- Mentha Viridis*. Scanty secretion of urine, frequent desire to pass water—gtt. x to 3j, water ℥iv.
- Mitchella*. Uneasy sensations in the pelvis, with dragging, ten-

derness on pressure, frequent desire to pass urine, and difficulty of evacuation— ʒj to water ʒiv .

Myrica. Increased secretion from mucous membranes, they being full and relaxed; full, oppressed pulse; imperfect circulation to surface and extremities.

Morphia. The pulse is small and soft, waves short and square, distance between waves long—this is the specific indication. It is permissible to relieve pain or produce sleep, when the pulse is soft, tongue moist.

Nepeta Cataria. Pain in abdomen, flexing of the thighs upon the abdomen, writhing of the patient, persistent crying— ʒj , water ʒiv .

Nicotiana Tabacum (tincture of the fresh plant). Pneumonia or bronchitis, with pallid skin, coldness of extremities, imperfect circulation of blood—gtt. x, water ʒiv .

Nitric Acid. Violet color of tongue, transparent, the redness of the tongue showing below—gtt. xx, water and syrup ʒij .

Nux Vomica. Sallow, expressionless tongue, with nausea and vomiting; sallow, expressionless mouth, with tinge of yellow; abdominal pain, paroxysmal, pointing at umbilicus; tumid abdomen with paroxysmal pain; paroxysmal pain in right hypochondrium, shooting to right scapula; paroxysmal pain in uterus, extending to umbilicus; in diarrhea the discharges are large, and attended with colicky pain.

Opium. The pulse is small, with short waves, gives a sensation of fullness. It is permissible to relieve pain and induce sleep, when the pulse is soft and open, the skin soft and inclined to moisture, tongue moist.

Passiflora. Irritation of brain and nervous system; sleeplessness; in fact wherever a harmless and certain soporific is demanded. In convulsions of childhood; nervous headache and neuralgia; infantile nervous irritation, tetanus and in epilepsy—gtt. xx to ʒiv to water ʒiv .

Penthorum Sedoides. Catarrhal inflammations; nasal catarrh, with fullness of mucous membranes and abundant secretion; spongy gums; fullness of fauces and mucous membrane of pharynx; catarrhal disease of stomach, catarrhal diarrhea—gtt. x to ʒj , water ʒiv .

Phosphorus (tincture of). Vesical and prostatic irritation, with mucoid discharges; fullness with dragging in perineum; dis-

charges of mucus from rectum, with sense of weariness from lower extremities. In pneumonia with sense of oppression, and difficulty of expectoration, livid face—gtt. v to x, water ʒiv .

Phosphorus (Phosphorated oil, Phosphorus pills; dose, gr. 1-100 to 1-50). As a nerve stimulant, especially when there is feeble reproductive power. Indications—a soft pulse, cold extremities, inelastic skin, pendulous scrotum, fullness of lower abdomen in women, without sharp pain.

Phytolacca. Soreness of mouth, soreness of throat, with tendency to death of epithelium; diphtheritic deposits, fullness about throat externally; enlarged cervical epithelium; caking of breasts, inflammation of breasts, sore nipples; disease of the skin or of the blood with death of and imperfect reproduction of the epithelium—gtt. x to ʒj , water ʒiv .

Pix Liquida. (Glycerole of Tar.) The remedy for pruritus ani, and for some diseases of the skin with pruritus. For cough with profuse bronchial secretion, add one part of glycerole of tar to seven parts of glycerine, two parts of water.

Plantago. Diseases of the gastro-intestinal mucous surfaces, when there are pinching or colicky pains; inflammatory affections of the skin, when there is pricking, itching, or burning pain; toothache and earache—gtt. xxx to ʒj to water ʒiv .

Podophyllum, *Podophyllin*. Fullness of veins, fullness of face, fullness of abdomen, fullness of tongue with pasty secretion.

Polygonum. Want of menstrual flow, chilly sensations in back, tensive pain, pain of legs, skin harsh and inactive—gtt. x to ʒij , water ʒiv .

Polytrichum. A hydragogue diuretic; in some cases incredibly increasing the flow of urine. It is most valuable in uric acid diathesis, lithemia, and in suppression of urine from cold—gtt. v to ʒj .

Potassæ Carbonas. Pallid, expressionless tongue, fullness of muscles, greater loss of strength than can be accounted for by conditions of disease—add to water so as to make a pleasant drink, and continue until tongue assumes its normal redness.

Potassæ Chloras. The antiseptic of the puerperal state; when portions of the placenta, blood-clots, etc., are retained and undergoing decomposition; fetid lochia, fetid breath, fetor as

from decomposing animal matter—from grs. v to ʒij may be given in the twenty-four hours, and used as a local application.

Potassæ Nitras. Scanty urine, with difficult respiration; difficult deglutition as from paralysis of muscles of the throat; enlargement of tonsils. Burned to relieve asthma—gr. v. to ʒij, water ʒiv.

Potassæ Permanganus. As a local application only, in phlegmonous erysipelas, in inflammation where tissues have lost vitality, and are inclined to slough; in the early stage of felons and boils, to arrest the progress of inflammatory action—ordinary use ʒj to water Oj; for the last use, grs. x, water ʒj.

Potassæ Sulphas. The color of the skin is dirty, tissues full and sodden, skin scaly; wounds heal slowly, inflame and suppurate—grs. v to grs. x three times a day in a glass of water.

Potassii Ferrocyanidum. Hysteria or hypochondriasis, with slow, imperfect waste and nutrition—ʒj to ʒss, water ʒiv.

Potassii Bromidum. For sleeplessness and restlessness, when there is a vigorous circulation, but without fever; epilepsy or convulsions with irritation of sexual organs; strong excitement of sexual organs.

Potassii Iodidum. Pale, leaden-colored tongue, usually full; contra-indicated by contracted red tongue. Antisyphilitic with this indication—grs. v to grs. x.

Propylamin. In rheumatism when febrile action has been relieved—gtt. v to gtt. x, mint water ʒiv.

Pulsatilla. Patient is nervous, despondent, restless, sleepless, pulse soft, easily compressed; eyes dull, dark line under them; reproductive excitement; fear of impending danger; menses arrested, tardy, scanty—gtt. x to gtt. xxx, water ʒiv.

Quinia Sulphas. Periodicity—the pulse being soft, skin soft, tongue moist and cleaning, nervous system free from irritation—antiperiodic quantity grs. x to grs. xx. As a stimulant, in small doses, when the above conditions of body are present.

Rheum. Irritation of stomach, nausea, vomiting; tongue elongated, reddened at tip and edges; diarrhea, with tenderness on pressure; sour smell of child—gtt. x to gtt. xx, water ʒiv.

Rhus Tox. Small, sharp pulse; pain in forehead, especially in left orbit; burning pain; tongue shows red spots on upper surface of tip—gtt. v, water ʒiv.

Rhus Aromatica. Diabetes, when the urine is pale colored, of

high specific gravity, with sugar in it, and the patient debilitated; diarrhea, with profuse and painful discharges, hemorrhage from the mucous surfaces of the kidneys, bladder, gastro-intestinal canal, uterus, lungs, and bronchi; incipient albuminuria; hypertrophy of the prostate, with great pain during micturition; enuresis of children and aged persons; chills, thirst, and constipation, with sugar in the urine; chronic diabetes, when no sugar is found in the urine and a large quantity of urine is passed, and there is great thirst; chronic catarrh of the bladder and chronic cystitis; chronic diarrhea and dysentery—gtt. xxx to 3iij to water ʒiv.

Rumex Crispus. Cough, with sense of irritation in trachea and larynx—gtt. v to ʒss, syrup ʒij.

Salicin. Periodicity, the patient complaining of severe pain, rheumatic in character, or simulating rheumatism—antiperiodic quantity grs. xv to grs. xxx, in divided doses. As an antirheumatic, the febrile action being controlled by the sedative.

Salvia. Profuse sweating, continued inaction of the skin, feet sweat and get cold, night sweats—gtt. v to ʒj, water ʒiv.

Salicylic Acid. Anti-rheumatic, and the indication, rheumatic pain without much febrile reaction; sub-acute rheumatism. The tongue is slightly leaden colored, and shows spots when the fur is lifted—as an anti-rheumatic, grs. ij, in pill, every three hours until grs. xx are taken. An admirable local application in chronic catarrhal disease of mucous membrane. ʒ Salicylic Acid, Borax aa. ʒj, water Oj.

Sambucus Canadensis. In disease of the skin, when the tissues seem full; epidermis separates and there is abundant serous discharge which forms crusts; indolent ulcers; tissues full, flabby, as if containing water—gtt. x to gtt. xx, water ʒiv.

Sanguinaria (Nitrate of). Tickling or irritation of throat with cough; sense of irritation in nose; uneasiness at supra-sternal notch; sense of uneasiness and burning in stomach, with nervousness—grs. j to grs. ij, syrup and water ʒiv.

Santonin. Intestinal worms, especially the long round worm; white line around the mouth and frequent itching about the nose, which are marked symptoms of intestinal worms; retention of urine, especially in the advanced stages of acute diseases of children; irritation, pain, and scalding sensations during and after micturition; enuresis, dysuria and chronic

cystitis; restlessness at night, gritting of the teeth, and night terrors. Of the first trituration one to three grains three or four times per day.

Saw Palmetto. Has a special action on the glands of the reproductive system, as mammæ, ovaries, prostate, testes, etc., tending to increase their functional activity; best effect produced upon enlarged prostate. Specially useful in atrophy of testes or uterus, and in all prostatic troubles—gtt xx to 3ij to water 3iv.

Scutellaria. Hysteria with inability to control the voluntary muscles; nervousness manifesting itself in muscular action—gtt. v to 3j, water 3iv. Sometimes quite large doses will be required.

Secale, Ergot. Dullness of intellect, disposition to sleep, dizziness; tissues full, inelastic; pulse oppressed; fullness of abdomen; hemorrhage with above conditions—gtt. j to 3ss.

Senecio. Enlargement of uterus with uterine or cervical leucorrhea; difficulty in urination—gtt. v to 3j, water 3iv.

Sodæ Nitræ. Violet color of tongue, transparent, the tongue being somewhat pallid below; tongue full, swollen, covered with a white or yellowish mucus—grs. x to 3ij, water 3iv.

Sodæ Phosphas. As a restorative when there is pallidity of the tongue and mucous membrane, and constipation. It is especially valuable for children—grs. j to grs. xx, three times a day.

Sodæ Sulphas. As an antidote to lead—3ss to water 3iv. To increase waste, when the skin is full, inelastic with brownish-sallow discoloration—grs. ij to grs. xv in a glass of water three times a day. It is a remedy in dysentery when there is the same appearance of skin.

Sodæ Sulphis. The tongue is broad, pallid, and has a dirty coat—grs. ij to grs. xx.

Spongia Tosta (in homeopathic dilution). Hoarse croupal cough, wheezing inspiration, soreness and burning in air passages—gtt. x to water 3iv.

Staphisagria. To allay irritation about the prostate gland, vesiculæ and testes, and to check prostaticorrhea and spermatorrhea; a remedy for gonorrhea and gleet. A nervous stimulant, useful where there are gloomy forebodings and violent outbursts of passion—3j to water 3iv.

Sticta. Cough, with pain in shoulders, extending to the occiput; rheumatic pains, with soreness of shoulders, cervical region, and occiput—gtt. x to 3j, water ʒiv.

Stillingia. Irritation of superior pharynx, and just behind the fauces, causing cough; hoarse croupal cough, paroxysmal, as if from great laryngeal irritation; skin disease, showing marked irritation, with ichorous discharge—for croup, the stillingia liniment as an external application; for chronic cough, the same, half to one drop on a lump of sugar; other uses, the tincture, gtt. x to 3ij, water ʒiv.

Stramonium. Delirious; can not rest in any position; continuously talking; seems to be fearful—gtt. v to x, water ʒiv.

Strophanthus. A heart tonic rather than a heart stimulant, and is indicated in almost any irregularity of the heart's action. Especially valuable in præcordial pain, palpitation, dyspnea, and valvular diseases with regurgitation. From a decided diuretic action it is a very efficient remedy in edema, anasarca, and Bright's disease—gtt. xx to 3j to water ʒiv.

strychnia. As an antiperiodic when the patient has difficult respiration, tardy and feeble urination, suffers from nightmare—gr. 1-60 to 1-20. In cholera or choleraic diarrhea, with the same symptoms and great muscular debility.

Sulphur. The skin is dirty, sallow, brownish, and the mucous membrane has a dirty hue.

Sulphurous Acid. The mucous tissues are of normal redness, but full and feeble; the tongue is coated with a moist, glutinous fur, having a tinge of brown—ʒss to water ʒiv; as a local application it is best used with a spray apparatus.

Thuja Occidentalis. Syphilitic or other diseases of bad blood, with warty excrescences, or ulceration, showing prominence of papillæ—gtt. x, water ʒiv.

Trifolium Pratense. An infusion of red-clover, has a specific influence in spasmodic cough, whooping-cough, and the cough of measles.

Triticum. This agent gives better results when given as an infusion. Catarrhal and purulent cystitis; irritation of the urinary apparatus; aching in the back which accompanies lithemia; dysuria and tenesmus; acute and chronic prostatitis; strangury and hematuria; lack of free secretion from the kidneys; excessive irritability of the bladder from any cause.

Urtica Dioica. Chronic diarrhea or dysentery with evacuations of mucus; chronic inflammation of bladder with abundant mucous discharge—gtt. x to 3j, water ℥iv.

Uvedalia. Enlargement of the spleen, ague cake; hypertrophy, with sensations of weight and dragging, and when felt seems sodden, wants elasticity; the skin is full, inelastic, and sallow—internally, gtt. j to gtt. xx; as a local application the uvedalia ointment, rubbed in with heat.

Valerian. A cerebro-spinal stimulant, especially valuable as a remedy in chorea when stimulation is desirable—gtt. ij to 3ss.

Veratrum Viride. The pulse is frequent and full, tissues full, not shrunk; surface flushed with blood. In erysipelas the part presents somewhat the appearance of an ordinary inflammation—gtt. v to 3j, water ℥iv.

Viburnum Opulus. Cramp-like pains, pain recurring at intervals; to prevent abortion or miscarriage; in dysmenorrhea, when the pains are expulsive; during labor if the pain assumes the form of spasmodic contraction, the muscular tissues of the perineum being also involved—gtt. x to 3ss, water ℥iv.

Viburnum Prunifolium. This has been regarded as especially the remedy to arrest abortion or miscarriage, and it may be used for the same indications as the other species—gtt. x to xx, water ℥iv.

Yerba Santa. A stimulant to the mucous membrane in affections of the respiratory organs, in chronic catarrhal gastritis, and in catarrh of the bladder—gtt. xx. to 3j to water ℥iv.

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